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A balett of a mylner.
A ballett god send me a wyfe that will do as I saye.
A ballett, I will no more go to the ploughe; with a nother new ballett annexed to the same.
A ballett of admonyssion to leve swerynge.
A ballett for my solas.
A ballett, in wynter's juste retorne.
A ballett, yf ever I mary I will mary a mayde.
A ballett, then and in these dayes, then, I say then knaves that be now wil be come honeste men.
A ballett it was a man in age truly.
A ballett, the Roseys frome my garden gonne.
ij ballettes, yf Care may cause men crye;
The sorowes that doth increase.
A ballett of a man that wold be unmaryd agayne.
A ballett of the a, b, c, of a preste called Heugh Stourmy.
The aged man's a, b, c.
For all these, as ys before wreten, accordynge to the ordinaunces. Rec. the some of——x ^{s}."

Some of these are known productions; and Mr. Collier, with praiseworthy minuteness, has invariably pointed out the volumes or repositories in which they are to be found. Others, hitherto unknown, have been discovered by Mr. Collier in a MS. of the time of James I. in his own keeping. One of these, thus recovered and enumerated in the above list, we shall transcribe entire.—

Maides and Widowes.

If ever I marry, I'le marry a maide:
To marry a widowe I am sore afrayde:
For maydes they are simple, and never will grutch,
But widowes full oft, as they saie, know to[o] much.

A maide is so sweete and so gentle of kinde,
That a maide is the wyfe I will choose to my minde:
A widowe is froward, and never will yeeld;
Or if such there be, you will meet them but seeld.

A maide nere complaineth, do what so you will;
But what you meane well a widow takes ill:
A widowe will make you a drudge and a slave,
And cost nere so much, she will ever go brave.

A maide is so modest, she seemeth a rose,
When it first beginneth the bud to unclose;
But a widowe full blowen full often deceives,
And the next winde that bloweth shakes downe all her leaves.

That widowes be lovelie, I never gainsaye,
But to[o] well all their bewtie they know to display;
But a maide hath so great hidden bewty in store,
She can spare to a widowe, yet never be pore.

Then, if I marry, give me a freshe maide,
If to marry with anie I need be not afrayde;
But to marry with anie it asketh much care,
And some batchelors hold they are best as they are.

The earliest 'Interlude' entry was made in 1557-8 by Henry Sutton.—

"To Henry Sutton, to prynte an interlude upon the history of Jacob and Esawe, out of the xxvii chapeter of the fyrste boke of Moyses, Called genyses: and for his lycense he geveth to the howse iiij^{d}."

On this Mr. Collier observes—

"No edition of this interlude is known anterior to that of 1568, when it bore the following title: 'A new mery and wittie Comedie or Enterlude, newlie imprinted, treating upon the Historie of Jacob and Esau, taken out of the 27th chap. of the first Boke of Moses, entituled Genesis.' It was then printed by Henry Bynneman, as the colophon proves—'Imprinted at London by Henrie Bynneman, dwelling in Knight-rider streete at the syne of the Mermayde, Anno Domini, 1568.' From the words 'newly imprinted' on the title-page we are not at all warranted in concluding that it had not appeared in print before; and perhaps the edition by Henry Sutton, above recorded, has been lost."

Here is an entry (also in 1557-8) of a sort of counterpart of Tusser's 'Hundred Good Points of Husbandry,' printed by Tottell in 1557, just before the commencement of the entries in Stationers' Hall. At a subsequent period (1570, if not earlier) both were united under the title of 'A Hundred Good Points of Husbandry lately married unto a Hundred Good Points of Huswifry.'—

"To John Daye, to prynte this boke, called the hundreth poyntes of good husserye; and for his lycense he geveth to the howse, iiij^{d}."

A licence of the same year relates to a well-known ballad:—

"To John Kynge, to prynte this boke Called Adam bell, &c., and for his lycense he geveth to the howse [*no sum*]."

This edition of 'Adam Bell,' 'Clym of the Clough,' and 'William of Cloudesley,' has not survived; and possibly it was anterior to that in the Garrick collection, printed without date by William Copland. Ritson, who reprinted the tale from Copland's impression, says nothing of any entry of it by Kyng. Kyng, as Mr. Collier suggests, may have parted with his interest in it to Copland. Here are other entries (in the next year, 1558-9) to the same John Kyng,—

"To John Kynge, to prynte these bokes folowynge; that ys to saye, a Jeste of syr gawaygne; the boke of Carvynge and sewynge; syr lamwell; the boke of Cokerye; the boke of nurture for mens servauntes; and for his lycense he geveth to the howse [*no sum*]."

"John Kynge is fyned for that he did print the nutbrowne made w^{t}out lycense, ij^{s}. vj^{d}."

No complete printed edition of 'The Jest of Sir Gawayne' has yet been discovered; but two fragments are known, one printed by Thomas Petit, and the other, more considerable, by John Butler. Kyng's impression has yet to be discovered. The fine which Kyng had to pay shows the early popularity of 'The Nut Brown Maid.'

The next entry of "Ballettes" occurs in 1558-9 to William Redle.—

"These vij Balettes were lycensed to William Redle, and Rycharde Lante to prynte them for him.
"Godly Imnes used in the Churche.
"Who are so merry as they of the lore estate.
"The proverbe true yt weddynge is destyne.
"The Robbery at gaddes Hill.
"Hold the ancer fast.
"Be mery, good Jone.
"The panges of Love, ii^{s}. iiij^{d}."

It would be interesting, says Mr. Collier, to discover 'The Robbery at Gaddes Hill' in some forgotten repository, and to find that Shakspeare had availed himself of it in his 'Henry IV.' Warton informs us that he had actually "seen this old ballad," and that it was by a person calling himself Faire, whom he supposes to be Thomas Phaer, the translator of the greater part of the Æneid.

On the 3rd of December 1559 the following entry of 8*d.* for two ballads was made by the clerk to the newly established company.—

"Receyvd of John Sampson, for his lycense for pryntinge these ij ballettes; the one called send me

your sonne, go your waye; and the other wemen be best whan thay be at Rest, viij^{d}."

The ballad on women is preserved in Mr. Collier's MS. and deserves transcription for its own merits:—

Women are best when they are at rest,
But when is that, I praye?
By their good will they are never still,
By night, and eke by daie.

If the weather is bad, all daye they gad,
They heede not winde or raine;
And all their gay geare they ruine or neare,
For why, they not refraine.

Then must they chat of this and that,
Their tongues alsoe must walke:
Where so ever they goe they alway do soe,
And of their bad husbandes talke.

When commeth the night, it is never right,
But ever somewhat wronge;
If husbands be wearie, they are so mery,
They never cease one song.

Then can they chide, while at their side
Their husbandes strive to sleepe;
'Why, how you snore! goe lye on the floore.'
Such is the coile they keepe.

So women are best when they are at rest,
If you can catch them still:
Crosse them, they chide, and are worse, I have tried,
If you grant them their will.

Give them their way, they still say, nay,
And chaunge their minde with a trice.
Let them alone, or you will owne
That mine was good advice.

Mr. Collier has transcribed the several entries with his own hand; and in the course of his examination has discovered the errors of Herbert, Dibdin and other writers who have had occasional recourse to the Register. The following entry refers to a lost dramatic performance:—

"Rd of Thomas Hackett, for his lycense for pryntinge of a playe of wytles iiij^{d}."

Herbert misquotes the entry and calls it "a playe of wytts," and Dr. Dibdin has followed him in his error. Another joint error of Herbert and Dibdin's is that of reading the clerk's entry of "Titus and Josepus," *i.e.* "Titus and Gisippus," for "Titus and Josephus:" and a third and more important, considering the time (1563-4), is that of "a boke of serten godly prayers of Lady Fanes" instead of "Lady Janes"—meaning, of course, Lady Jane Grey. Some of the errors thus exposed by Mr. Collier would form an entertaining supplement to Mr. Disraeli's chapter 'On the Ignorance of the Learned.'

A 'True Report of the Burning of St. Paul's' was entered to "Mr. Serys" on the 11th of June, 1561, exactly seven days after the occurrence. Serys's Tract is, we believe, unknown; but Mr. Collier, seldom at a loss for a curious illustration, subjoins the following ballad—from the same valuable MS. in his own possession:—

The Burning of Paules.

Lament eche one the blazing fire
That downe from heaven came,
And burnt S. Powles his lofty spyre
With lightnings furious flame.
Lament, I say,
Both night and day,
Sith London's sins did cause the came.

The first came downe from heaven soone,
But did not strike the crosse,
At fower in the afternoone,
To our most grevous losse.
Could nothing stay
The sad decay:
The lead was molten into drosse.

For five long howers the fire did burn
The roof and timbers strong:
The bells fell downe, and we must mourne,
The wind it was so strong,
It made the fier
To blaze the higher,
And doe the church still greater wrong.

O, London! thinke on thine amisse,
Which brought this great mishap:
Remember how thou livde in blisse,
And layde in vices lap.
O, now begin,
Repent thy sin,
And say it shall no more entrap.

The following entries (1561-2) relate to Thomas Tusser.—

"Rd of Rycharde Tottle, for his lycense for pryntinge of a boke intituled one hundredth good poyntes of husboundry maryed unto a hundreth good poyntes of huswyfry, newly corrected and amplyfyed. iiij^{d}.

"Rd of Thomas Hackett, for his lycense for pryntinge of a dialoge of wyvynge and thryvynge of Tusshers, with ij lessons for olde and yong. iiij^{d}.

No edition of so early a date, in which the "good points of husbandry" are "married to a hundred good points of huswifry," is now known. Dibdin quotes John Kyng's "sale catalogue" upon this question,—in ignorance of this important entry in the Register, which directly and strongly confirms the fact that he is endeavouring to establish. The "dialoge of wyvynge and thryvynge of Tusshers" is not now known.

Prints were occasionally entered by stationers desirous of obtaining the protection of the court. Here is a curious list in 1562-3 entered to Gyles Godhed.—

"Recevyd of Giles Godhed, for the copyes, as foloweth.—

The pycture of the prynce of Condee.
The Carde of London.
The pycture of the devell and the pope.
The pycture of Kynge Henry the eight.
The mappe of englonde and skotlande.
The story of the emperours.
The story of the iij cheldren.
The pycture of Kynge Edward the vj.
The pycture of quene Elyzabeth.
The Creation of the Worlde.
The pycture of paule the appostell.
The pycture of Saloman the wyse.
The pycture of the King of Swathlande.
The dyscryption of the howse of an harlotte.
The armes of englonde.
The example of Justice.
The pycture of Charyte. x$^{s.}$"

'The Carde of London' in this very remarkable list of early pictorial representations refers, Mr. Collier thinks, (and we agree with him,) to Agas's well-known map of London, hitherto assigned, on supposition only, to the year 1560. Mr. Collier is in error in thinking that the map of Agas published in 1737 by the Society of Antiquaries was actually worked from Agas's own plates. The fact is, the map was re-engraved by Vertue, and that only three impressions of the original map are now known—one in the Pepysian Library at Cambridge, a second in the Guildhall Library, and the third at Lambeth.

The following entries (selected almost at random) refer to books and ballads not now known:—

"1562/3. Rd of Thomas Colwell, for his lycense for pryntinge of a playe intituled Dyccon of bedlam, iiij^{d}.

Rd of Alexandre Lacye for his lycense for pryntynge of a boke the xx orders of Callettes or drabbys, iiij^{d}.

Rd of Mr. Scrys, for his lycense for pryntynge of a boke intituled Certayn noble storyes, contaynynge Rare and Worthy matter, iiij^{d}.

Rd of Thomas Colwell for his lycense for pryntinge of a ballett intituled the daperest Countrey man that came to the Courte to wooy, iiij^{d}.

Rd of John Tysdayle, for his lycense for pryntinge of a mery Ryme consernynge butchers, grasyers, schole maisters, and tankerd bearers, &c., iiij^{d}.

1563/4. Rd of Thomas Colwell, for his lycense for pryntinge of a ballett intituled the Complaynte of a mayde in London, declarynge hyr trubbles to over passe the pryntes ['prentice] lyfe and affyrmynge the same by her ungentle Rewardes, iiij^{d}.

Rd of William Griffyth for his lycense for pryntinge of a ballett intituled a defence for mylke maydes agaynst the terme of Mawken, iiij^{d}.

1564/5. Rd of Thomas Colwell, for his lycense for pryntinge of a ballett intituled a fayrerynge, the fayre will come as the fayre doth goe, the more ye Rede the more ye knowe, iiij^{d}.

1565/6. Rd of Wylliam Pekerynge, for his lycense for pryntinge of a ballett intituled the Lamentation of a yonge man beynge presoner in the Counter, in the Pultrye in London, iiij^{d}.

Rd of Owyn Rogers, for his lycense for pryntinge of a ballett intituled the sounge of paeyeute Gressell unto hyr make, iiij^{d}.

1567/8. Rd of Henry Denham, for his lycense for pryntinge of a boke intituled a mery metynge of maydes in London, iiij^{d}.

1568/9. Rd of Thomas Purfoote, for his lycense for pryntinge of a boke intituled Debytor and Creditor, made by Pele, ij$^{s.}$ vj^{d}.

Rd of Aly, for his lycense to prynte a ballett intituled desperate Dycke, iiij^{d}.

Rd of Shyngleton, for his lycense for pryntinge of the Retorne of olde well spoken nobody, iiij^{d}.

1569/70. Rd of James Robertes, for his lycense for pryntinge the Country clowne doth moche desyre a gent to be, &c., iiij^{d}.

Rd of Thomas Colwell, for his lycense for the pryntinge of the ballett intituled a newe wel a daye as playne m^{r} papeste as Dunstable way, iiij^{d}.

Rd of John Alde, for his lycense for pryntinge of a ballett intituled how maydes shulde penne the dore, &c., iiij^{d}.

Rd of peter frynshe, for his lycense for the pryntinge of a ballett intituled home ys homelye be yt never so ill, iiij^{d}.

Rd of Wyllm greffeth, for his lycense for the pryntinge of a ballett intituled taken nappynge as mosse tooke his meare, iiij^{d}."

Under the year 1568-9 occurs the following entry.—

"Rd of m^{r} Irelonde, for his lycense for pryntinge of a boke intituled Beware the Catt, by Wyllm Bawdwin iiij^{d}."

This, says Mr. Collier, is an important entry, which has escaped observation,—though settling definitively that the initials G. B., attached to 'Beware the Cat,' are those of William or Gulielmus Baldwin, the author of the first part of the 'Mirror for Magistrates,' &c. Ritson speaks of 'Beware the Cat' (Bibl. Poet., 118) as first printed in 1561,—and that such was the case a fragment with that date attests; but here we see it entered in 1568-9, there being no licence for its publication in 1561. It was unquestionably reprinted in 1584 by Edward Allde,—a copy, without title-page, having a colophon, so stating. This is the only exemplar (four leaves above alluded to excepted) of any date now known.

Dekker's 'Lanthorn and Candlelight,' 1609, was preceded by a ballad on the same subject licensed to be printed in 1569-70.—

"Rd of Wyllm greffeth, for his lycense for pryntinge of a ballett intituled Lantern and Candle lyghte, iiij^{d}."

This production, says Mr. Collier, whatever it might be, preceded Dekker's tract with the same title by about forty years: how much the latter author was indebted to the earlier cannot be known, as no such work printed or published by Griffith has come down to us. The preceding entry has never attracted attention; and until now it was unknown that Dekker had adopted the title of a ballad or tract which had been popular in his childhood. Dekker calls his production 'Lanthorne and Candle-light, or the Bell-mans second Nights-walke,' &c.,—and it was at least twice printed in 1609.

A poet of the name of Gray is mentioned by Puttenham in his 'Art of English Poesy' (1589) as having been "in good estimation" with Henry the Eighth, and afterwards with the Protector Somerset, "for making certain merry ballads, whereof a chief one was 'The Hunt is up, the Hunt is up.' In the editor's MS. are two ballads, one called 'The Kinges hunt is upp,' and the other, 'The newe Hunt's upp,'—the first of which may be the very song

written by Gray, since "Harry our King" is twice mentioned in it. It is an extremely sprightly performance.—

The Kinges Hunt is upp.

The hunt is up, the hunt is up,
And it is well nigh daye,
And Harry our King is gone hunting
To bring his deere to baye.

The east is bright with morning light,
And darkness it is fled,
And the merie horne wakes up the morne
To leave his idle bed.

Beholde the skyes with golden dyes
Are glowing all around,
The grasse is greene, and so are the treene
All laughing at the sound.

The horses snort to be at the sport,
The dogges are running free,
The wooddes rejoyce at the mery noise
Of hey tantara tee ree!

The sunne is glad to see us clad
All in our lustie greene,
And smiles in the skye as he riseth hye,
To see and to be seene.

Awake, all men, I say agen,
Be mery as you maye,
For Harry our King is gone hunting,
To bring his deere to baye.

The following ballad, 'Gyve place ye Ladyes,' was entered to Thomas Colwell in 1566-7. This again is new to our collections.—

Give place, you ladyes all,
unto my mistresse faire,
For none of you, or great or small,
can with my love compare.

If you would knowe her well,
you shall her nowe beholde,
If any tonge at all may tell
her beautie[s] manyfolde.

She is not high ne lowe,
but just the perfect height,
Below my head, above my hart,
and then a wand more straight.

She is not full ne spare,
but just as she sholde bee,
An armfull for a god, I sweare;
And more—she loveth mee.

Her shape hath noe defect,
or none that I can finde,
Such as in deede you might expect
from so well formde a minde.

Her skin not blacke, ne white,
but of a lovelie hew,
As if created for delight;
yet she is mortall too.

Her haire is not to[o] darke,
no, nor I weene to[o] light;
It is what it sholde be; and marke—
it pleaseth me outright.

Her eies nor greene, nor gray,
nor like the heavens above;
And more of them what needes I say,
but they looke and love?

Her foote not short ne longe,
and what may more surprise,
Though some, perchance, may thinke me wrong,
'tis just the fitting size.

Her hande, yea, then, her hande,
with fingers large or fine,
It is enough, you understand,
I like it—and 'tis mine.

In briefe I am content
to take her as she is,
And holde that she by heaven was sent
To make compleate my blisse.

Then ladies, all give place
Unto my mistress faire,
For now you knowe so well her grace,
You needes must all dispaire.

The following entry refers to a work of Skelton's, hitherto misdated by Warton and Dyce:—

"Rd of Thomas Colwell, for his lycense for pryntinge of a boke intituled serten mery tales of skyltons, iiij[d]."

And this relates to a publication of Churchyard's not included in any list of his works, and unnoticed by Herbert, Dibdin, Ritson and others:—

"Rd of Thomas Colwell, for his lycense for pryntinge of a ballett intituled admonition agaynste dice play, by churche yarde, iiij[d]."

An elaborate index adds greatly to the value and utility of this volume:—which is one of the best contributions to our literature that the Shakespeare Society has issued since 'Henslowe's Diary' and the 'Lives of the (original) Actors in Shakespeare's Plays.'

Nasology; or, Hints towards a Classification of Noses. By Eden Warwick. Bentley.

Such is the universally admitted connexion between body and soul that there is scarcely an organ of the former which has not been said to be in some degree an index of the latter. The material clay is moulded by the formative spirit within, and the outward glance introduces at once to the perishing tabernacle and to its spiritual occupant. The beautiful body should be the residence of a beautiful soul: and the poet has said that

Passions link'd to forms so fair
And stately, needs must have their share
Of noble sentiment.

On this general principle, without regard to the abundant exceptions, have been built up those pseudo-sciences which profess to divine the character of the mind by the shape and texture of the various parts of the animal structure. In earlier ages, what there may be of truth in the proposition was wrested for the purpose of giving to the prophecy of the witch or of the gipsy the semblance of probability. Even now, the maiden holds out her hand to the gaze of the fortune-teller,—while the disciples of Lavater might trace back the history of their race into the earliest periods of human existence. Divested of their errors, palmistry, physiognomy, craniology, and phrenology are so many expressions of the fact of the dependence of body upon mind.

We will not here discuss the propriety of subdividing the science of physiognomy into parts,—though for the sake of mere classification that were, of course, a convenient arrangement. To class men according to their faces or the bumps on their heads on a complicated system, is no joke:—take a single part, as the hair, the ears, the eyes, or the nose, and the task is simplified amazingly. The leading objection to the present work is that it fails of proof that the diversified expressions of mind conferred on other parts of the body are all summed up in the nose. This is, we are sorry to say, a fundamental fault in a book devoted to a science which, on account of its easy application and the facility with which the part in question may be examined, will, we predict, speedily drive phrenology out of the field.

In employing the nose as a means of classifying the mental characteristics of man, the author divides it into six classes. The first two are thus described.—

"Class I. The Roman, or Aquiline nose, is rather convex, but undulating as its name aquiline imports. It is usually rugose and coarse; but when otherwise it approaches the Greek nose, and the character is materially altered. It indicates great decision, considerable energy, firmness, absence of refinement, and disregard for the *biensèances* of life. Class II. The Greek, or straight nose, is perfectly straight; any deviation from the right line must be strictly noticed. If the deviation tend to convexity, it approaches the Roman nose, and the character is improved by an accession of energy; on the other hand, when the deviation is towards concavity, it partakes of the 'Celestial,' and the character is weakened. It should be fine and well-chiselled, but not sharp. It indicates refinement of character, love for the fine arts and *belles-lettres*, astuteness, craft and a preference for indirect, rather than direct action. Its owner is not without some energy in pursuit of that which is agreeable to his tastes; but, unlike the owner of the Roman nose, he cannot exert himself in *opposition* to his tastes. When associated with the Roman nose, and distended slightly at the end by the cogitative, it indicates the most useful and intellectual of characters; and is the highest and most beautiful form which the organ can assume."

The combination of these forms has characterized those who have most remarkably influenced the destiny of nations. Julius Cæsar, Alexander the Great, Napoleon, all rejoiced in this form of their proboscoid member. The following reflections on the career of Napoleon and comparison with another great name may give our readers a taste of this author's wisdom—and of the manner in which men are "led by the nose."—

"Ambition of future fame was far more the ruling passion of Napoleon than lust of present power. His mind, with all its imperfections and meannesses (as whose is without?), was too noble to be satisfied with mere personal aggrandizement. All the great mistakes of his life were occasioned by his obedience to the passion for future fame. When swayed by the mere desire of power, all his acts were successful. As General, Consul, or Dictator, Napoleon never made one false step; but when he became Emperor, when he saw all Europe (except one little pugnacious island) lying helpless at his feet, he began to revolve schemes which could not enhance, but might risk, his personal power. Then he attempted to realize his long-cherished dream of Eastern conquest—a conquest not to be held, but to be overrun; a conquest like that of Alexander, Nadir Shah, or Kinghis Khan. Often and often did he exclaim, 'the seat of all fame is the east.' To realize this empty fame, he took the false step of invading Egypt. Foiled there, he still hoped to penetrate Asia by land, and gathered all his strength to overwhelm Russia, his last and greatest error. They greatly err who think these were mere schemes to keep France embroiled, lest peace should annihilate his power. They equally err who ridicule and attribute to a childish vanity his ambition to link himself by marriage with the imperial families of Europe. It was no childish vanity, but a politic endeavour to found a dynasty, which should hand down his name as its founder to the latest ages. They again who can see nothing better in the melancholy spectacle of Napoleon at St. Helena, engaged in falsifying records and altering figures to deceive the world, but a drivelling vanity, utterly miscomprehend the man. Fame, fame to the utmost limits of human duration was to his last moment his highest ambition. Foiled in everything else, he yet hoped to secure fame. He knew that under his name the most eventful page in the History of Europe, since the fall of Rome, must be written, and he naturally desired

To be among the worthies of renown,
And so sit fair with fame, with glory bright.
Daniel.

To describe the character of Wellington, is to reverse that of Napoleon. Napoleon was shrewd, artful, and deceitful; Wellington open-hearted, strong-sensed, candid and sincere. Napoleon a clever statesman; Wellington obtuse in politics. Napoleon a great strategist; Wellington short-sighted, though daring, in the field. Napoleon a lover and patron of arts; Wellington a despiser of them. Napoleon said to be personally timid; Wellington constitutionally brave. Napoleon's cruelties were acts of cool calculation and state-policy; Wellington's of military fury. Napoleon poisoned his prisoners because he did not know what else to do with them, and murdered the Duke d'Enghien to produce 'an effect' in Europe; Wellington's cruelties were the necessary consequences of war energetically carried on, and were never the result of cold-blooded predetermination."

Our author's third class of noses is the Cogitative, or wide-nostrilled. His examples make it quite clear—though at the expense of metre—that

When *men* go astray,
Their *noses* are more in fault than they.

"It is, as its secondary name imports, wide at the end, thick and broad; not clubbed, but *gradually* widening from below the bridge. The other noses are seen in profile, but this in full face. It indicates a cogitative mind, having strong powers of thought, and given to close and serious meditation. Its indications are of course much dependent on the form of the nose in profile, which decides the turn the cogitative power will take."

The quality of mind dialled by this form of

nasal pronunciation is the highest:—and such a nose we assume to be the author's own. Under the patronage of this select feature he introduces short notices of poets, scientific men, theologians, artists, lawyers, statesmen, metaphysicians, and historians,—and it serves him, also, as the occasion of discussing some of the more prominent characters of the philosophy of the present day. A few modern examples of the want of the cogitative nose would not have been uninteresting at this stage of the work.—It will be satisfactory to our readers to know that there is a chapter on the question of "How to get a cogitative nose."

The next nose in our author's list is the Jewish—whose character we need not describe. "It indicates considerable shrewdness in worldly matters and deep insight into character, and facility of turning that insight to profitable account." It must not be supposed that this nose is confined to the Hebrew race. It is, in fact, the money-getting nose, and ought to be (alas, for nasology!) the nose of our own middle classes if the following passage be correct.—

"The Phœnicians were Syrians, and the portraits which we have of these people on the Egyptian sculptures, as read by Sir G. Wilkinson, all exhibit this form of nose. It is unnecessary to enlarge on the very early commercial activity of this nation, on its extensive traffic, its flourishing colonies, and its mighty fleets. While the rest of the world was in barbarism, or kept their low civilization carefully locked up within their own dominions, the Phœnicians were spreading arts and letters among the barbarous nations of Europe, and carrying civilization forward on its destined course towards the West. And the incentive to this and the means whereby it was effected were the same as those which now animate modern Tyre to promote the same westward tendency of civilization. What Phœnicia, a little corner of Asia, did for Europe, England, a little corner of Europe, has done and is doing for lands still further west — America and Austral-Asia; destined to be in their turns the seats of a still progressive civilization, until every part of the earth shall have been in succession blessed with a civilization, if not always equal in degree, always adequate to its age, requirements, and capacity."

The remaining noses catalogued by our author are the "Snub," and the "Turn-up" or "Celestial." These names are too graphic to need definition; and we instinctively partake of the author's distaste and reluctance to introduce the subject. Our unwillingness yields, however, to the conviction that it is as easy to avoid a "snub" or "celestial" nose as to get a "cogitative" one.—

"The mind shrinks from the thought, that after contemplating the powerful Roman-nosed movers of the world's destinies, or the refined and elegant Greek-nosed arbiters of art, or the deep and serious-minded thinkers with Cogitative noses, it must descend to the horrid bathos, the imbecile inanity of the Snub. Perhaps the reader expects that we are going to be very funny on the subject of these noses. But we are not;—far from it. A snub nose is to us a subject of most melancholy contemplation. We behold in it a proof of the degeneracy of the human race. We feel that such was not the shape of Adam's nose; that the original type has been departed from; that the depravity of man's heart has extended itself to his features, and that, to parody Cowper's line, purloined, by the bye, from Cowley:—

God made the *Roman* and man made the *Snub*.

Fortunately for our hypothesis, and for our feelings, we cannot find a single instance of the existence of either the Celestial or the Snub among celebrated persons, except in those who are illustrious by courtesy rather than by their actions, and whom station, not worth, has made conspicuous."

The work concludes with chapters on feminine and national noses. With regard to the former, we shall surprise our fair readers when we tell them that they need be in no trouble at all about the questions discussed in these pages—as they have little or no interest in the matter. The author says, "but for a small *hiatus* in the prosody, Pope's line would read equally well thus,—

Most women have no noses at all."

We have not space to quote any of the fine things which the author says of the sex to make amends for this quotation. The subject of national noses leads to some interesting reflections on races,—for the truth of much of which we must refer to our ethnological friends. There is, however, some painful truth in the following.—

"Naturally, however, the Celtic is not a low-class race. It may not have been originally so highly organized, or so mentally gifted as the Gothic: but in its infancy it had virtues which long thraldom has exterminated. It is no fiction that Cæsar found the Gaulish and British youth more apt than the Goths at acquiring the arts and language of Rome, and that, in a few years, Roman civilization, more efficient than Saxon, had converted Britain into one of the most fertile and well-ordered provinces of the empire. It is no fiction that Rome found in Britain one of the most determined opposers of its claim to universal dominion, and that if it were to be

Asked, why from Britain Cæsar did retreat?
Cæsar himself might whisper—he was beat.

It is no fiction that after British Christianity had been driven by Saxon Paganism from Britain into Ireland, the Irish Celts furnished the best schools for literature, and the ablest scholars in Europe—and it is no fiction that ever since the Saxon has set foot in Ireland it has continued to droop and decay, until it is now a foul bog of iniquity; a wretched irreclaimable sink of inhuman vice and monstrous infamy. This is but the caged wild beast gnawing at its chain, and snapping at its keeper, whether his hand approaches to feed or to heal it. Its Cogitativeness has been repressed till it cannot reflect nor appreciate any but physical modes of escape from thraldom. It may be said, escape lies open to it in self-elevation, in moral rectitude, and industrious exertion; but it is too late for it to see and understand that. We might as well say to the broken leg, walk now, you walked once; or to the encaged madman, calm yourself and be free, you were calm and free once. We need no better proof of the non-cogitativeness of Ireland than the facile manner in which it throws itself beneath the Juggernautic car of every demagogue, and sacrifices itself to his avaricious cruelty. We need no better proof of the truth of our theory, than that the Nose of the same nation is deficient in Cogitativeness, and is, for the most part, thin and sharp. It has not, however, lost the Romano-Greek profile usual among the Caucasian races."

We cannot but think that these remarks, taken with their context, are fertile in suggestion for the statesman. Ireland's may after all turn out to be a surgical case,—and some Talicotian process be the cure for all her ills. The study of the legislator should be "how to get" her "a cogitative nose."

But we must conclude.—That the book contains amusement as well as instruction we will affirm to our readers:—but as to the science of Nasology, we must leave each of them to decide for himself. If it be true that men "follow their noses" in a double sense, we are put on the scent of a new species of cultivation. The establishment of the nose as a moral barometer has this great convenience, that there is no concealing the indicator. We see, too, the aptness of an established form of punishment—which has more of an instinctive philosophy in it than may hitherto have been dreamt of. The direct mode of attacking the vice which insults us is by "pulling the nose."

Life, Letters, and Literary Remains of John Keats. Edited by Richard Monckton Milnes.

[Second Notice.]

WITH John Keats, as we have said, thought and action were identified. There is a state of mental activity in which the thinker perpetually realizes his ideal,—and this is not seldom the condition of imaginative and poetic minds. These suffer themselves, particularly in the season of youth, to have no rest. Full of conceptions and projects, attempting theme after theme, with a thirst for employment and a fervour of enthusiasm that allow no pause,—they pursue the path to fame with the speed of a racer striving to be first at the goal. Such was eminently the case with John Keats:—and such indeed is, in some degree, the condition of every true poet. When, therefore, Mr. Milnes says that "to the Poet, if to any man, it may justly be conceded to be estimated by what he has written rather than by what he has done, and to be judged by the productions of his genius rather than by the circumstances of his outward life,"—agreeing with the sentiment, we would correct the terms in which it is rather disguised than enunciated. "What the poet has written" is precisely what, in the truest sense, he "has done." His poems are his works:—by these he must be judged. The "circumstances of his outward life" are not his deeds at all—but the conditions to which he has been more or less passively subject. What we have to consider, in relation to them, is the manner in which the poet may have modified and put his stamp upon them:—for this every true man of genius will assuredly do.

Mr. Milnes commits a slight error at the commencement of his biography,—which, slight as it is, has tended to perplex his narrative and throw an air of mystery over certain points that otherwise need have presented little difficulty. John Keats, he tells us, was "born on the 29th of October, 1795. He had two brothers, George, older than himself, Thomas, younger, and a sister much younger." Now, it happens, that George was not "older," but younger than himself. John Keats was the *eldest* child of his parents. His mother, as in many other instances of men of genius, exerted much influence on his early developement. She was "tall, had a large oval face, and a somewhat saturnine demeanor;"—but inspired John with so much affection, that once when she was ill, the doctor having ordered that she should not be disturbed, he "kept sentinel at her door for above three hours with an old sword he had picked up, and allowed no one to enter the room."

"At this time he was between four and five years old, and later he was sent, with his brothers, to Mr. Clarke's school at Enfield, which was then in high repute. Harrow had been at first proposed but was found to be too expensive. A maternal uncle of the young Keats's had been an officer in Duncan's ship in the action off Camperdown, and had distinguished himself there both by his signal bravery and by his peculiarly lofty stature, which made him a mark for the enemy's shot; the Dutch admiral said as much to him after the battle. This sailor-uncle was the ideal of the boys, and filled their imagination when they went to school with the notion of keeping up the family's reputation for courage. This was manifested in the elder [younger] brother by a passive manliness, but in John and Tom by the fiercest pugnacity. John was always fighting; he chose his favourites among his schoolfellows from those that fought the most readily and pertinaciously, nor were the brothers loth to exercise their mettle even on one another. This disposition, however, in all of them, seems to have been combined with much tenderness, and, in John, with a passionate sensibility, which exhibited itself in the strongest contrasts. Convulsions of laughter and of tears were equally frequent with him, and he would pass from one to the other almost without an interval. He gave vent to his impulses with no regard for consequences; he violently attacked an usher who had boxed his brother's ears, and on the occasion of his mother's death, which occurred suddenly, in 1810, (though she had lingered for some years in a consumption,) he hid himself in a nook under the master's desk for several

days, in a long agony of grief, and would take no consolation from master or friend. The sense of humour, which almost universally accompanies a deep sensibility, and is perhaps but the reverse of the medal, abounded in him; from the first, he took infinite delight in any grotesque originality or novel prank of his companions, and, after the exhibition of physical courage, appeared to prize these above all other qualifications. His indifference to be thought well of as 'a good boy,' was as remarkable as his facility in getting through the daily tasks of the school, which never seemed to occupy his attention, but in which he was never behind the others. His skill in all manly exercises and the perfect generosity of his disposition, made him extremely popular: 'he combined,' writes one of his schoolfellows, 'a terrier-like resoluteness of character, with the most noble placability,' and another mentions that his extraordinary energy, animation, and ability, impressed them all with a conviction of his future greatness, 'but rather in a military or some such active sphere of life, than in the peaceful arena of literature.' This impression was no doubt unconsciously aided by a rare vivacity of countenance and very beautiful features. His eyes, then, as ever, were large and sensitive, flashing with strong emotions or suffused with tender sympathies, and more distinctly reflected the varying impulses of his nature than when under the self-control of maturer years: his hair hung in thick brown ringlets round a head diminutive for the breadth of the shoulders below it, while the smallness of the lower limbs, which in later life marred the proportion of the person, was not then apparent, any more than the undue prominence of the lower lip, which afterwards gave his face too pugnacious a character to be entirely pleasing, but at that time only completed such an impression as the ancients had of Achilles,—joyous and glorious youth, everlastingly striving."

Poetry was with Keats an impulse long before it became an art. It was not the result of a regular education, but of a boyish love of books. In Mr. Charles Cowden Clarke, the son of his preceptor, Keats found a companion who sympathized in his intellectual tastes. Virgil and Fénelon had already occupied him in school translation. Of the Greek language he was ignorant—but of its mythology he gained some knowledge through Took, Spence, and Lemprière. In 1812, the perusal of 'The Faery Queen' at once decided his mental direction:—and many of the faults of his own poetry may be traced to too close an imitation of Spenser's style.

On leaving school, in 1810, the incipient poet was apprenticed for five years to Mr. Hammond, a surgeon at Edmonton. Becoming at length "aware that he had no real interest in the profession he was sedulously pursuing," Keats found himself "in the midst of that sad conflict between the outer and inner worlds which is too often, perhaps always in some degree, the Poet's heritage in life." Nevertheless, he removed to London for the purpose of walking the hospitals, and took lodgings in the Poultry,—where he cultivated the further acquaintance of his literary friends. His acquaintance with Mr. Ollier led to the publication of his first volume; a small book containing some sonnets, odes, and epistles—manifesting great contempt for the Pope school of verse—and claiming for the modern the freedom of our elder bards. It advocates at the same time a preference for beauty over power in composition:—a creed to which the young minstrel thus gave utterance.—

> Strength alone, though of the Muses born,
> Is like a fallen angel—trees uptorn,
> Darkness and worms and shrouds and sepulchres
> Delight it—for it feeds upon the burrs
> And thorns of life, forgetting the great end
> Of Poesy, that it should be a friend
> To soothe the cares and lift the thoughts of men.

Ere long, however, we find Keats testifying to the powerful *afflatus* that was in himself. In 1817, he thus writes:—

"I find I cannot exist without Poetry—without eternal Poetry; half the day will not do the whole of it. I began with a little, but habit has made me a leviathan. I had become all in a tremble from not having written anything of late: the Sonnet overleaf (*i. e.* on the preceding page) did me good; I slept the better last night for it; this morning, however, I am nearly as bad again. Just now I opened Spenser, and the first lines I saw were these—

> The noble heart that harbours virtuous thought,
> And is with child of glorious great intent,
> Can never rest until it forth has brought
> Th' eternal brood of glory excellent.

Let me know particularly about Haydon, ask him to write to me about Hunt, if it be only ten lines. I hope all is well. I shall forthwith begin my 'Endymion,' which I hope I shall have got some way with before you come, when we will read our verses in a delightful place I have set my heart upon, near the Castle."

Having engaged upon 'Endymion,' Keats grew conscious of another experience,—that "our prime objects" become in their prosecution "a refuge as well as a passion." The "trumpet of fame," he says fantastically, "is a tower of strength; the ambitious bloweth it, and is safe." However, the work, ere well begun, suffered interruption through some "money troubles" announced by his brother George. But the poem was, nevertheless, continued and finished. Messrs. Taylor & Hessey, with whom he had made arrangements for its publication, advanced him money, with which he was enabled, as he stated, "to destroy some of the minor heads of that hydra, the dun." In the same letter which contains this passage, certain traces of physical weakness indicate the need of caution in the conduct of his intellectual labour. This difficulty Keats met fairly. He took his recreation in the country, changing the air and the scene at will—and while he rambled from spot to spot, in Scotland and in Ireland, composed poetry as it were "in the eye of nature": but yearning, as he tells us, "for a life of sensation rather than of thought." Some curious speculations, not remarkable for intelligibility, are upon this point addressed, under the title of "friend and brother," to Mr. Bailey; of whom Mr. Milnes tells us that he and our author were, indeed, brothers "not only in affection and in thought," but "also in destiny. Mr. Bailey died soon after Keats." This is an error. The Rev. Benjamin Bailey is yet living—or was so not long since—in the capacity of chief chaplain at Ceylon.—But to return.

There can be no doubt that Keats suffered from the *Blackwood* and *Quarterly* critics on account of his political associates, Hunt and Hazlitt. He belonged to the "Cockney School,"—that was enough! What of good could come out of that Nazareth? We think that Mr. Milnes has done injustice to the school by comparing it with that of Marino: he makes amends, however, by censuring the tardy appearance of Mr. Jeffrey's article in the *Edinburgh Review*. It came out just two years too late—in 1820 instead of 1818. Late as it was, it betrayed Byron into a fit of "jealous injustice": for which, it is fair to add, the wayward bard subsequently sought to atone,—though not without much absurd inconsistency even in the manner of making the *amende*. The use to which Keats himself turned the attacks upon him reflects high credit on his character as an author and as a man. That use was (in Mr. Milnes's words) "to purify his style, correct his tendency to exaggeration, enlarge his poetical studies, and produce, among other improved efforts, that very 'Hyperion' which called forth from Byron a eulogy as violent and unqualified as the former onslaught."

The earlier poetry of Keats was not of an erotic cast:—its allusions to the passion of love are few, cold and feeble. But the time came at length when the fountain of this mighty affection was unsealed. The poet's awakening perception to female beauty is graphically and curiously demonstrated in the following,—being part of a letter to his brother George and his wife, then in America.—

"The Misses —— are very kind to me, but they have lately displeased me much, and in this way:—now I am coming the Richardson!—On my return, the first day I called, they were in a sort of taking or bustle about a cousin of theirs, who, having fallen out with her grandpapa in a serious manner, was invited by Mrs. —— to take asylum in her house. She is an East-Indian, and ought to be her grandfather's heir. At the time I called, Mrs. —— was in conference with her up stairs, and the young ladies were warm in her praise down stairs, calling her genteel, interesting, and a thousand other pretty things, to which I gave no heed, not being partial to nine days' wonders. Now all is completely changed: they hate her, and, from what I hear, she is not without faults of a real kind; but she has others, which are more apt to make women of inferior claims hate her. She is not a Cleopatra, but is, at least, a Charmian: she has a rich Eastern look; she has fine eyes, and fine manners. When she comes into the room she makes the same impression as the beauty of a leopardess. She is too fine and too conscious of herself to repulse any man who may address her: from habit she thinks that *nothing particular*. I always find myself more at ease with such a woman: the picture before me always gives me a life and animation which I cannot possibly feel with anything inferior. I am, at such times, too much occupied with admiring to be awkward or in a tremble: I forget myself entirely, because I live in her. You will, by this time, think I am in love with her, so, before I go any further, I will tell you I am not. She kept me awake one night, as a tune of Mozart's might do. I speak of the thing as a pastime and an amusement, than which I can feel none deeper than a conversation with an imperial woman, the very 'yes' and 'no' of whose life is to me a banquet. I don't cry to take the moon home with me in my pocket, nor do I fret to leave her behind me. I like her, and her like, because one has no *sensations:* what we both are is taken for granted. You will suppose I have, by this, had much talk with her—no such thing; there are the Misses —— on the look-out. They think I don't admire her because I don't stare at her; they call her a flirt to me—what a want of knowledge! She walks across a room in such a manner that a man is drawn towards her with a magnetic power; this they call flirting! They do not know things; they do not know what a woman is. I believe, though, she has faults, the same as Charmian and Cleopatra might have had. Yet she is a fine thing, speaking in a worldly way; for there are two distinct tempers of mind in which we judge of things—the worldly, theatrical and pantomimical; and the unearthly, spiritual and ethereal. In the former, Bonaparte, Lord Byron, and this Charmian, hold the first place in our minds; in the latter, John Howard, Bishop Hooker rocking his child's cradle, and you, my dear sister, are the conquering feelings. As a man of the world, I love the rich talk of a Charmian; as an eternal being, I love the thought of you. I should like her to ruin me, and I should like you to save me.

> I am free from men of pleasure's cares,
> By dint of feelings far more deep than theirs.

This is 'Lord Byron,' and is one of the finest things he has said."

About this time we find that Keats had half resolved to gain an income by periodical writing:—but some pecuniary encouragement from Mr. Taylor seems to have altered his determination. Nevertheless, he felt that "it was quite time that he should set himself doing something, and live no longer upon hopes."—But now the family complaint, consumption, suddenly proclaimed the progress which it had been secretly making on the poet's constitution.—

"One night about eleven o'clock, Keats returned home in a state of strange physical excitement—it might have appeared to those who did not know him, one of fierce intoxication. He told his friend he had been outside the stage-coach, had received a severe chill was a little fevered, but added, 'I don't feel it

now.' He was easily persuaded to go to bed, and as he leapt into the cold sheets, before his head was on the pillow, he slightly coughed and said, 'That is blood from my mouth; bring me the candle; let me see this blood.' He gazed steadfastly for some moments at the ruddy stain, and then looking in his friend's face with an expression of sudden calmness never to be forgotten, said, 'I know the colour of that blood,—it is arterial blood—I cannot be deceived in that colour; that drop is my death-warrant. I must die.' A surgeon was immediately called in, and, after being bled, Keats fell into a quiet sleep. The medical man declared his lungs to be uninjured, and the rupture not important; but he himself was of a different opinion, and with the frequent self-prescience of disease, added to his scientific knowledge, he was not to be persuaded out of his forebodings. At times, however, the love of life, inherent in active natures, got the better of his gloom. 'If you would have me recover,' he said to his devoted friend and constant attendant, Mr. Brown, 'flatter me with a hope of happiness when I shall be well, for I am now so weak that I can be flattered into hope.' 'Look at my hand,' he said, another day, 'it is that of a man of fifty.'"

We are, of course, prepared, in the poet's future history, for those fluctuating hopes and fears that usually accompany the different stages of this insidious disease. Keats had begun to feel that, notwithstanding the malevolence of critics and the temporary neglect of the public, he might without vanity assure himself of a poetic immortality. Unwilling to surrender the prospects thus opened up to him, he longed to live that he might realize the expectations both of himself and of his friends. As giving him a chance of life, the recommendation of a journey to Italy was eagerly embraced: and his friend, Mr. Severn, consented to accompany him. The poet's acquaintance with the artist commenced in 1817: their mutual inspiration had made them necessary companions. A letter, dated the 28th of September, 1820, from on board the vessel in which they had embarked together, shows how dreadfully Keats was haunted by the conflicting phantoms of Love and Death. Here is an extract.—

"The very thing which I want to live most for will be a great occasion of my death. I cannot help it. Who can help it? Were I in health it would make me ill, and how can I bear it in my state? I dare say you will be able to guess on what subject I am harping—you know what was my greatest pain during the first part of my illness at your house. I wish for death every day and night to deliver me from these pains, and then I wish death away, for death would destroy even those pains, which are better than nothing. Land and sea, weakness and decline, are great separators, but Death is the great divorcer for ever. When the pang of this thought has passed through my mind, I may say the bitterness of death is passed. I often wish for you, that you may flatter me with the best. I think, without my mentioning it, for my sake you would be a friend to Miss —— when I am dead. You think she has many faults, but for my sake think she has not one. • • I seldom think of my brother and sister in America; the thought of leaving Miss —— is beyond every thing horrible—the sense of darkness coming over me—I eternally see her figure eternally vanishing; some of the phrases she was in the habit of using during my last nursing at Wentworth Place ring in my ears. Is there another life? Shall I awake and find all this a dream? There must be, we cannot be created for this sort of suffering."

The friends encountered a storm in the Bay of Biscay; and the invalid's suffering grew greater and greater during the long dreary voyage and a ten days' miserable quarantine at Naples. Once on shore, comparative cheerfulness for a time returned. But a tragedy was to be enacted, of a pathos too painfully unmitigated. We have scarcely ever read of a strife more terrible. Many will doubt if the secrets of this long anguish should have been revealed. The public has scarcely a right to enter that sick-room in which disease physical and moral was doing its terrible work.—

"The persuasion," he continued, "that I shall see her no more will kill me. My dear Brown, I should have had her when I was in health, and I should have remained well. I can bear to die—I cannot bear to leave her. Oh, God! God! God! Everything I have in my trunks that reminds me of her goes through me like a spear. The silk lining she put in my travelling cap scalds my head. My imagination is horridly vivid about her—I see her—I hear her. There is nothing in the world of sufficient interest to divert me from her a moment. This was the case when I was in England; I cannot recollect without shuddering, the time that I was a prisoner at Hunt's and used to keep my eyes fixed on Hampstead all day. Then there was a good hope of seeing her again—Now!—O that I could be buried near where she lives! I am afraid to write to her—to receive a letter from her—to see her hand-writing would break my heart—even to hear of her anyhow, to see her name written, would be more than I can bear. My dear Brown, what am I to do? Where can I look for consolation or ease? If I had any chance of recovery, this passion would kill me. Indeed, through the whole of my illness, both at your house and at Kentish Town, this fever has never ceased wearing me out. When you write to me, which you will do immediately, write to Rome (*poste restante*)—if she is well and happy, put a mark thus +; if——"

Disgusted with Naples the poet hurried to Rome; where he had the benefit of Dr. (now Sir James) Clark's professional advice and personal kindness to an extent which gives that physician a noble place in this melancholy record. For the account of the last scene we are indebted to Mr. Severn,—in a series of sketches, which do honour to his pen as the pen of a powerful writer and to his heart as the heart of a priceless friend. The poet's fortitude had completely failed; and it was the office of his friend to administer hope to the hopeless. Keats, from his medical education, knew his own symptoms; he was consciously in the presence of death, while the passions of love and fame attached him more strongly than ever to life. Imagination and memory served to increase the horrors of the situation. The poetic fancy, once his greatest blessing, became an intolerable curse. Night after night, Mr. Severn sat up with the dying poet: and both he and Dr. Clark had to administer at once to a body and "a mind diseased." In other respects, too, the circumstances of the case were unhappy.—

"All that can be done he [Dr. Clark] does most kindly, while his lady like himself in refined feeling, prepares all that poor Keats takes, for in this wilderness of a place, for an invalid, there was no alternative. Yesterday Dr. Clark went all over Rome for a certain kind of fish, and just as I received it carefully dressed, Keats was taken with spitting of blood. We have the best opinion of Dr. Clark's skill: he comes over four or five times a-day, and he has left word for us to call him up, at any moment, in case of danger. My spirits have been quite pulled down. These wretched Romans have no idea of comfort. I am obliged to do everything for him. I wish you were here. I have just looked at him. This will be a good night. *Jan. 15th*, 1821, *half-past Eleven*.—Poor Keats has just fallen asleep. I have watched him and read to him to his very last wink; he has been saying to me—'Severn, I can see under your quiet look immense contention—you don't know what you are reading. You are enduring for me more than I would have you. O! that my last hour was come!' He is sinking daily; perhaps another three weeks may lose him to me for ever! I made sure of his recovery when we set out. I was selfish: I thought of his value to me; I made my own public success to depend on his candour to me. Torlonia, the banker, has refused us any more money; the bill is returned unaccepted, and to-morrow I must pay my last crown for this cursed lodging-place: and what is more, if he dies, all the beds and furniture will be burnt and the walls scraped, and they will come on me for a hundred pounds or more! But, above all, this noble fellow lying on the bed and without the common spiritual comforts that many a rogue and fool has in his last moments! If I do break down it will be under this; but I pray that some angel of goodness may yet lead him through this dark wilderness. If I could leave Keats every day for a time I could soon raise money by my painting; but he will not let me out of his sight, he will not bear the face of a stranger. I would rather cut my tongue out than tell him I must get the money—that would kill him at a word. You see my hopes of being kept by the Royal Academy will be cut off, unless I send a picture by the spring. I have written to Sir T. Lawrence. I have got a volume of Jeremy Taylor's works, which Keats has heard me read to-night. This is a treasure indeed, and came when I should have thought it hopeless. Why may not other good things come? I will keep myself up with such hopes. Dr. Clark is still the same, though he knows about the bill: he is afraid the next change will be to diarrhœa. Keats sees all this—his knowledge of anatomy makes every change tenfold worse: every way he is unfortunate, yet every one offers me assistance on his account. He cannot read any letters, he has made me put them by him unopened. They tear him to pieces—he dare not look on the outside of any more: make this known. *Feb. 18th.*—I have just got your letter of Jan. 15th. The contrast of your quiet friendly Hampstead with this lonely place, and our poor suffering Keats, brings the tears into my eyes. I wish many many times that he had never left you. His recovery would have been impossible in England; but his excessive grief has made it equally so. In your care he seemed to me like an infant in its mother's arms; you would have smoothed down his pain by variety of interests, and his death would have been eased by the presence of many friends. Here, with one solitary friend, in a place savage for an invalid, he has one more pang added to his many—for I have had the hardest task in keeping from him my painful situation. I have kept him alive week after week. He has refused all food, and I have prepared his meals six times a day, till he had no excuse left. I have only dared to leave him while he slept. It is impossible to conceive what his sufferings have been: he might, in his anguish, have plunged into the grave in secret, and not a syllable been known about him: this reflection alone repays me for all I have done. Now he is still alive and calm. He would not hear that he was better: the thought of recovery is beyond everything dreadful to him; we now dare not perceive any improvement, for the hope of death seems his only comfort. He talks of the quiet grave as the first rest he can ever have. In the last week a great desire for books came across his mind. I got him all I could, and three days this charm lasted, but now it has gone. Yet he is very tranquil. He is more and more reconciled to his horrible misfortunes. *Feb. 14th.*—Little or no change has taken place, except this beautiful one, that his mind is growing to great quietness and peace. I find this change has to do with the increasing weakness of his body, but to me it seems like a delightful sleep: I have been beating about in the tempest of his mind so long. To-night he has talked very much, but so easily, that he fell at last into a pleasant sleep. He seems to have happy dreams. This will bring on some change,—it cannot be worse—it may be better. Among the many things he has requested of me to-night this is the principal—that on his grave-stone shall be this inscription:—

'HERE LIES ONE WHOSE NAME WAS WRIT IN WATER.'

You will understand this so well that I need not say a word about it. When he first came here he purchased a copy of 'Alfieri,' but put it down at the second page—being much affected at the lines

'Misera me! sollievo a me non resta,
Altro che il pianto, *ed il pianto è delitto!*'

Now that I know so much of his grief I do not wonder at it. Such a letter has come! I gave it to Keats supposing it to be one of yours, but it proved sadly otherwise. The glance at that letter tore him to pieces; the effects were on him for many days. He did not read it—he could not—but requested me to place it in his coffin, together with a purse and a letter (unopened) of his sister's; since then he has

told me *not* to place that letter in his coffin, only his sister's purse and letter, and some hair. I, however, persuaded him to think otherwise on this point. In his most irritable state he sees a friendless world about him, with everything that his life presents, and especially the kindness of others, tending to his melancholy death."

At this time it was that a letter was written to Mr. Severn by one of the many friends of the dying poet, from which we must make an extract, notwithstanding the length which we have already allowed ourselves, because of its earnest and solemn beauty. It was from Mr. Leigh Hunt—but came too late. Even "while the warm words were being written in his own old home, he had already been committed to a distant grave."—

"Mr. Brown tells me he is comparatively calm now, or rather quite so. If he can bear to hear of us, pray tell him—but he knows it all already, and can put it in better language than any man. I hear that he does not like to be told that he may get better; nor is it to be wondered at, considering his firm persuasion that he shall not recover. He can only regard it as a puerile thing, and an insinuation that he cannot bear to think he shall die. But if this persuasion should happen no longer to be so strong upon him, or if he can now put up with such attempts to console him, remind him of what I have said a thousand times, and that I still (upon my honour, Severn) think always, that I have seen too many instances of recovery from apparently desperate cases of consumption, not to indulge in hope to the very last. If he cannot bear this, tell him—tell that great poet and noble-hearted man—that we shall all bear his memory in the most precious part of our hearts, and that the world shall bow their heads to it, as our loves do. Or if this again will trouble his spirit, tell him we shall never cease to remember and love him, and, that the most sceptical of us has faith enough in the high things that nature puts into our heads, to think that all who are of one accord in mind and heart, are journeying to one and the same place, and shall unite somehow or other again, face to face, mutually conscious, mutually delighted. Tell him he is only before us on the road, as he was in everything else; or whether you tell him the latter or no, tell him the former, and add that we shall never forget he was so, and that we are coming after him. The tears are again in my eyes, and I must not afford to shed them."

But we must hurry to the close. Page after page of the volume presents the same harrowing scene of the constant friend watching the winding up of the mournful tragedy.—

"He opens his eyes in great doubt and horror, but when they fall upon me, they close gently, open quietly and close again, till he sinks to sleep. This thought alone would keep me by him till he dies: and why did I say I was losing my time? The advantages I have gained by knowing John Keats are double and treble any I could have won by any other occupation. Farewell.—*Feb. 27th.*—He is gone: he died with the most perfect ease—he seemed to go to sleep. On the twenty-third, about four, the approaches of death came on. 'Severn—I—lift me up—I am dying—I shall die easy; don't be frightened—be firm, and thank God it has come.' I lifted him up in my arms. The phlegm seemed boiling in his throat, and increased until eleven, when he gradually sunk into death, so quiet, that I still thought he slept. I cannot say more now. I am broken down by four nights' watching, no sleep since, and my poor Keats gone. Three days since the body was opened: the lungs were completely gone. The doctors could not imagine how he had lived these two months. I followed his dear body to the grave on Monday, with many English. They take much care of me here—I must else have gone into a fever. I am better know, but still quite disabled. * * The letters I placed in the coffin with my own hand."

Keats was buried in the Protestant Cemetery at Rome;—

"One of the most beautiful spots on which the eye and heart of man can rest. It is a grassy slope, amid verdurous ruins of the Honorian walls of the diminished city, and surmounted by the pyramidal tomb which Petrarch attributed to Remus, but which antiquarian truth has ascribed to the humbler name of Caius Cestius, a Tribune of the people, only remembered by his sepulchre. In one of those mental voyages into the past, which often precede death, Keats had told Severn that 'he thought the intensest pleasure he had received in life was in watching the growth of flowers;' and another time, after lying a while still and peaceful, he said, 'I feel the flowers growing over me.' And there they do grow, even all the winter long—violets and daisies mingling with the fresh herbage, and, in the words of Shelley, 'making one in love with death, to think that one should be buried in so sweet a place.'"

The spot is finely celebrated in Shelley's 'Adonais.'—But we must pause. We have left ourselves no space for reflections, if any were needed and we had the heart to make them. This was no common struggle between vulgar life and death—but a terrible picture of Life, Love, and Fame in desperate antagonism with the Destroyer. It contains in it the finest poetic elements; but as a reality it affects us too deeply. In its contemplation, the mystery of life is fearfully intensified and "the burthen" of the "unintelligible world" weighs wearily upon the heart.

The Interlude of the Disobedient Child. By Thomas Ingeland. Edited by James Orchard Halliwell, F.R.S., F.S.A., Hon. M.R.I.A., Hon. M.R.S.L., F.R.A.S., &c. Printed for the Percy Society.

THAT the various publishing Societies have rendered service to Literature by the occasional production of useful and valuable volumes is not to be denied: but the praise which belongs to them has unhappily to be largely qualified in respect of the frequent appearance of volumes like the present. Such abuses of a useful object have suggested grievous doubts whether the evil does not more than counterbalance the advantages resulting from this application of the principle of association to literary purposes.

If the Council of the Percy Society do not actually select the books to be printed for the use of their members, we presume that they have at least a veto on the publication of any trifling work which an editor ambitious rather for the number of books that he edits than for the editorial skill applied may be desirous to issue at their expense. Whether the 'Interlude of the Disobedient Child' deserved to be reprinted may be a question; but there can be none that if it were to have the sanction of the Percy Society, it ought not to have been accompanied by a set of notes such as here illustrate at once the book and the body—even though offered to them by a writer entitled to sneer at the commentators, and talk of their "blunders" as "corrected in my 'Dictionary of Archaisms.'" The only serious mode of treating such a publication is to give sufficient specimens of these remarkable notes:—and we have copied the titles with which Mr. Halliwell presents himself on his title-page, that our readers may judge of the value of diplomas and associations which are justified by such commentaries.—

Page 4. Most wickedly with an unshamefast* face.
* *Without shame—shameless!*

Ibid. And maryed the same incontynente.*
* *Immediately. See Othello, Act* IV. *sc.* 3.

Page 5. A waye more commodyous to my judgement.*
* *That is, according to my judgment. See Lear,* I. 4.

Page 6. Therefore thoughe ye crye tyll ye reve* asunder.
* *To split or burst. Generally spelt* rive.

Page 7. So to a boye, both dayntie and nyce.*
* *Both tender and delicate.*

Page 8. The scholehouse for me shall stande alone.*
* *Stande alone. Compare Troilus and Cressida,* I. 2.

Ibid. Which was the cause of his sepulture.*
* *Burial. From the Latin.*

Whatever University produced Mr. Halliwell may justly be proud of etymological discoveries like these; and Societies like the Percy surely justify the authority which they assume, and the cost at which such authority is maintained, by successful lights thrown on the meaning of words like 'Sepulture.' Mr. Halliwell's seems to us a most plausible guess:—and our readers will be glad to benefit further by his labours.

Page 9. They coulde not prynt* it within my head deeply.
* *Impress. Compare Much Ado about Nothing,* IV. 1.

Page 10. Nay, by the masse, I holde* ye a grote.
* *Bet. See Taming of the Shrew.*
Now, by Saint Jamy
I hold you a penny.

Ibid. What thinge doth most my conscience perse.*
* *Pierce.*

Page 12. Loe, this it is, without further dilacion.*
* *Delay.* (!)

Ibid. Therefore out of hande,* with all spede possibly.
* *Out of hande, at once.*

Page 13. And with many other beare a great swaye.*
* *Compare Comedy of Errors,* II. 1.

Page 15. And after the proverbe, we put oyle to fyre.*
* *Bring oil to fire. King Lear,* II. 2. *Compare also All's Well that ends Well.* V. 3.

Page 16. To make them goe trickaie.*
* *Neat. My tricksy spirit. Tempest.* V. 1.

Ibid. He hath of knaverye tooke such a smell.*
* *Smell of calumny. Measure for Measure,* II. 4.

Page 19. And in his owne countrey* taryo styll.
* *Often used formerly for county.*

Ibid. Her tonge and her tune* is very shryll.
* *Voice.*

Page 21. With broylynge and burnynge in the kytchyn adayes.*
* *In the daytime.*

Ibid. It were almes,* by my trothe.
* *A common phrase, equivalent to it were a good thing. See Much Ado about Nothing,* II. 3.

Ibid. Where is my sweetynge* whom I do seeke.
* *What, sweeting, all amort. Taming of the Shrew.*

Page 22. Now shall I know all an some.*
* *Altogether—entirely.*

Ibid. My darling, my conye,* my byrde so bryght of blee.†
* *Rabbit. A term of endearment.*
† *My Lady so fair in countenance. The expression is common in our early Romances.*

Ibid. Do ye aske and* my love be faste a sleepe.
* *If!*

Ibid. I thought it surely a whole hundred yere.*
* *Twelve year since. Tempest.*

Page 23. Now of such thynkes* therefore to make an ende.
* *Things. A provincialism.*

Ibid. I am not his calfe* nor yet his foole.
* *A term of contempt for a fool. See Much Ado about Nothing,* III. 3.

We sadly fear that some who read this note may be troubled with a recollection of Goldsmith's epigram—

Howe'er from this time, I shall ne'er see your Graces,
As I hope to be saved, without thinking of Asses.

The F.R.S. and F.S.A. who tells us that Calf is employed as "a term of contempt" and the Society who pay for his doing so are in great danger of a personal application of the word, under the poet's uncivil suggestion.—Is it worth while to pursue this matter?—

Page 24. Or els all is not worth a brasse pynne.*
* *At a pin's fee. Hamlet.*

Page 25. And therefore let my father spyte* and spurne.
* *Anger. And that which spites me more than all these wants. Taming the Shrew.*

Page 26. Who lysteth therat to laugh or lowre.*
* *To look sad. This term is often incorrectly explained. "Eye, how impatience lowreth in your face."* (*Com. Err.*) i. e. *makes your face look sad, opposed to the merry look.*

Ibid. That many a tyme and oft* I am fayne.
* *Compare the Merchant of Venice,* I. 3.

Page 30. That unthrifte,* my sonne.
* *Upstart unthrifts. Richard II.*

Page 35. And wyll not with Aristotle in his Ethickes* agree.
* *This confirms in some measure a reading in the Taming of the Shrew—"or so devote to Aristotle's Ethicks."*

Ibid. Longe of whom* was made such cheare.
* *Owing to whom.*

Page 37. What calling for biskettes, cumfettes and caroweies.*
* *Caraway comfits. See* 2 *Henry* IV. *and the blunders of the Commentators corrected in my 'Dictionary of Archaisms,' p.* 231.

Mr. Halliwell, it is here indicated, is great upon the subject of *Caraway Comfits!* He does not condescend to tell the reader of this reprint what these "Caraway Comfits" really are; but finds in the present mention of them

a fitting opportunity to refer to the display of learning and research "in my 'Dictionary of Archaisms,'" in which he has "corrected the blunders of the Commentators." As it is possible that all the members of the Percy Society may not possess that monument of Mr. Halliwell's lexicographical talents, we have taken the trouble to extract from it the passage in question. It is as follows:—

"CARAWAYES, Palsgrave has 'Caraways, small confettes, drugge.' 'These comfits were made with caraway seeds, and, odd as it may now appear, eaten with fruit for promoting eructation. Caraways are still considered carminative.' It is melancholy to peruse the blundering of the Commentators on this word in 2 Henry IV. v. 3. Our ancestors did not eat the seeds by themselves as a part of their desserts or banquets; caraways there mean caraway comfits."

We now, in justice to Mr. Halliwell and the Commentators, recommend our readers to turn to the seventeenth volume (p. 213) of the last edition of the Variorum Shakspeare—that they may form a proper estimate of the great archæological merits of the former.

Nearly the whole of the notes to the remaining twenty pages of the 'Interlude' are of the same quality as those here given. Such are the Comments on a little poetical tract of the sixteenth century, considered worth gravely putting forth by a learned Society and avowing by a gentleman who, though he has in the present instance modestly limited the expression of his literary honours to the string of symbols which we have transcribed at the head of the present article, figures in the title-page of the said 'Dictionary of Archaisms' by the following overwhelming array:—"Fellow of the Royal Society, Honorary Member of the Royal Irish Academy, Corresponding Member of the Royal Society of Northern Antiquaries, of the Society of Antiquaries of Scotland, of the Archæological Society of Stockholm, and the Reale Accademia di Firenze, Honorary Member of the Royal Society of Literature, of the Newcastle Antiquarian Society, of the Royal Cambrian Institution, of the Ashmolean Society at Oxford, and of the Society for the Study of Gothic Architecture, Fellow of the Society of Antiquaries, Corresponding Member of the Comité des Arts et Monuments, &c. &c."!

Our readers may see, in what we have said, the sort of qualifications that are fitted to make the literary and scientific tour of the world, so far as these Societies are concerned, under their present constitutions.—We know not what additional title the mysterious "&c. &c." which concludes the above list of honours may stand for; but if it mean "competent editor," we are bound, on such authority as the pamphlet before us, to pronounce it an unwarranted usurpation.

OUR LIBRARY TABLE.

Home among Strangers: a Tale. By Maria Hutchins Callcott.—So many and so dreary have been the stories of suffering governesses recently published, that we are grateful to the authoress of this excellent moral tale for exhibiting a picture of a rather different pattern. Her governess is young, susceptible, and enters upon her career fettered with a love engagement. The family, too, in which she commences governess-ship is headed by the unfeeling Lady who is so constant a figure in similar novels, and,—alas for womanhood!—so much too often found in real life. But Lucy sets about her work with resolutions to do her duty and to be happy, and fulfils both, in spite of vicissitude, misunderstanding, the insolence of her employers, and the untoward tempers of some of her pupils. Perhaps our benevolent authoress endows her heroine with an amount of influence and persuasion which is beyond possible attainment. But we will not quarrel with this, so heartily glad are we to hear the reward, in a quiet mind, of duty preached. Our philanthropists would be shocked were they told that love of lucre and respect for rank were too often the "be-all and end-all" of their tales and warnings. Yet such is virtually the case when narrow fortunes and class distinctions are depicted as the greatest trials to which Humanity is liable. Our argument is in nowise sympathetic with that of those hard teachers who tell the pauper that he has fewer cares than the rich man, or who assure the free that the slave does not wish for liberty:—it simply confines itself to this maxim, that the honourable bearing of responsibilities brings with it a content not to be purchased by money nor damaged by any scorn or contempt from bystanders.

The Business of Life. By Catharine Sinclair.—Dullness is fatiguing enough, but super-animation far more so. Miss Sinclair seems to have under command a shower-bath of anecdotes in readiness to be discharged upon any and every subject. When we travelled in her company some years ago, there was not a milestone but provoked a reminiscence, good, bad, or indifferent,—not an old tree, but was labelled with some smart speech or other. By every river's side flowed on a stream of gossip *de omnibus rebus*, and illustrations as far-fetched as those of Mr. Weller junior, but far less quaint. The lady has here set her engine playing upon the Gospel of St. Mark—producing a series of "daily readings" which show us a better commonplace book than commentator. We cannot but reject such a brisk and loquacious exposition as this. Even Miss Sinclair's own plea "of the animating friction of a fire-side dialogue" does not reconcile us to being scrubbed bright by one "good story" after another, till no leisure for thought is left to us. Her book is infinitely fluent and rather amusing: but we were more struck while reading it by the *sixteen-woman* power of memory which it displays than by any manifestation of reverence for Scripture on the part of its writer. Never was any production less adust or severe than the 'Daily Readings' of Dr. Chalmers; but with all the cheerfulness and poetic fancy they disclose, they leave a serious impression. Miss Sinclair's book has failed to do so on our minds,—well-meant though it doubtless is.

Stanton: a Tale. By D. M. Dunlop, Esq.—A romance is here of the most romantic quality. Gipsies, gamblers, a wicked brother-in-law, an abused father, and mysterious females who take an interest in the hero and are each and all as ready to narrate their histories as *Guinea* in 'Bubbles of the Day,' crowd its pages. Further, we are not sure whether we ever met a novel so full of pistol-shots.

Eda Morton and her Cousins; or, School-Room Days.—This story tells us how a Scottish hoyden of good family was shaped by kind relations under whose care she was cast into a young Scottish lady. As a picture of manners it is curious; since some of the adventures described could not have happened in any English family save one presided over by an eccentric such as Mr. Edgeworth's friend, Mr. Day. The tale is well meant, but rather tedious; and we suspect that the writer has changed his intention with regard to a main incident in order to avoid ending his fiction with the *grown-up* wedding.—which in a book for young persons may be thought by grave preceptors to be an unadvisable close.

My Sister Minnie. By Mrs. Mackenzie Daniel. 3 vols.—How the favourite daughter of a family begins life by loving unwisely, and subsequently becomes the innocent rival of her elder sister by being married to the man whom our narrator loves,—are told with pathos and delicacy. How the aunt of these sisters, in return for slights shown to her husband during his lifetime, devises a cunning revenge after his death, is also set forth: but this incident may be objected to as unnatural. In the days when Amelia Opie's novels were sought for and Mrs. West's poems could find readers, 'My Sister Minnie' would have won its authoress a golden reputation. Now it can be welcomed but as one of a larger family, less symmetrical and lovely than some of its seniors, yet still not lacking beauty and interest.

The Ibis (or Sacred Bird) of England; being a humble attempt to show how, in England, the Life of a Partridge may outweigh that of a Man in value. By a Freischutzer.—A book which it was quite superfluous to describe as a first attempt. It is not without a certain amount of force; but it cannot be called clever—or even very promising for the future. The title describes the object with sufficient amplitude and accuracy—we cannot say that it is skilfully worked out. The tone assumed is of the dramatic and defiant, but the conception is commonplace. The title is taken, without acknowledgment, from *Punch*—and the texture of the story borrowed from the coarsest police-court materials. The subject is not an unpromising one:—but for its popular treatment it would demand qualities of wit, humour, and pathos, which the Freischutzer has no pretensions to. He who first christened the partridge the ibis of England is the sort of man to write its history.

Sanitary Ramblings. By Hector Gavin, M.D.—These consist of "Sketches and Illustrations" of the almost inconceivably abominable condition of Bethnal Green. Such an exposure of intolerable dirt, disorder, and stupidity, in one locality—offered as a type of the general condition of the metropolis, and other large towns—is well calculated to quicken the movement in favour of sanitary reform and deaden the sympathy for all vested rights which oppose it.

The Locomotive. By Peter Progress.—This little work comprises a history of the steam-engine, and of its different locomotive applications, by land and water;—with that of the various experiments made for adapting it to common roads. An account of the atmospheric railway is appended.

The Life of Jesus Christ. By Augustus Neander. Translated from the fourth German Edition, by J. M'Clintock and C. E. Blumenthal.—This is an American translation, with an English preface which fails to conceal the trans-Atlantic origin of the former. The present work of Neander's is not, in our estimation, equal to his 'History of the Church.' It is not marked by either the same impartiality or the same discrimination. This circumstance is probably owing to its having been written as an answer to Strauss—not expressly indeed, but implicitly; and there are many passages which the author would not have sanctioned had they been employed with any other than a controversial purpose. The line of argument adopted is not that which so acute a writer would have used in the discovery of pure truth for his own private satisfaction,—but such as is considered legitimate to establish a case against an opponent.

LIST OF NEW BOOKS.

Bartholomew's (J.) Egypt, new edition, 18mo. 1s. cl. swd.
Bee Hunter (The), by the Author of 'The Pathfinder,' 3 vols. 31s. 6d.
Billing and Burns's Antiquities of Scotland, Vol. I. 4to. 2l. cl.
Bennet's (L.) The Family of Bethany, 12th edition, fc. 5s. cl.
Burns's (J.) Notes of a Tour in the United States, 12mo. 2s. cl.
Coles (J.) On Spinal Affections, 3rd edition, fc. 2s. 6d. swd.
Colman's (H.) Agric. and Rural Economy of France, Belgium, &c. 8s.
Colling's (J. R.) Gothic Ornaments, Vol. I. 4to. 3l. 13s. 6d. cl.
Conquerors of the New World and their Bondmen, Vol. I. 6s. cl.
Dallas's (A. R. C.) The Book of Psalms, royal 32mo. 2s. cl.
Debaun's (Rev. W.) Selections for Composing, &c. 6th Series, 2s. 6d.
Guthrie's Great Interest, by Chalmers, D.D., 7th edition, fc. 1s. 6d.
Hand (The), Phrenologically Considered, post 8vo. 4s. 6d. cl.
Ince's (H.) Outlines of French History, 3rd edition, 18mo. 1s. swd.
Lee's (E.) Continental Travels, 8vo. 10s. 6d. cl.
Major's (J. R.) Outline Scripture Maps and Key, 4to. and 12mo. 2s.
Maunder's (Samuel) Treasury of Natural History, 12mo. 10s. cl.
M'Crindell's (Miss) The Convent, 2nd edition, fc. 8vo. 5s. cl.
Noel's (Rev. Baptist W.) Infant Piety, 4th edition, 18mo. 1s. 6d. cl.
Parlour Library, 'Monte Christo,' Vol. III. 12mo. 1s. bd.
Petit's (J. L.) Abbey Church of Tewkesbury, 8vo. 6s. cl.
Politics for the People, 8vo. 2s. 6d. bds.
Potter's (Richard) Treatise on Mechanics, 8vo. 8s. 6d. cl.
Pusey's (Rev. E. B.) Sermons, 2nd edition, 8vo. 10s. 6d. cl.
Rattray's (James) Costumes of Afghanistan, folio, 5l. 5s. bds.
Rimbault's (E. F.) First Book of the Pianoforte, 18mo. 1s. 6d. cl. swd.
Ross's (W. A.) Yacht Voyage to Norway, Sweden, &c., 2 vols. 21s. cl.
Sherwin's (Mrs. H.) Root of the History of England, 12mo. 2s. cl.
Sidney's Australian Hand-Book, 18mo. 1s. swd.
Strickland and Melville's The Dodo and its Kindred, 4to. 21s. cl.
Stanley's Faith of a Church of England Man, by the Rev. R. Eden, 6s.
Wallbridge's (E. A.) The Demarara Martyr, 8vo. 7s. cl.

GRESHAM PROFESSORSHIP OF GEOMETRY.

IN reply to our remarks on this subject [*ante*, p. 770], we have received the following.—

Aug. 10.

The tone of the article on this subject in the *Athenæum* is unjust towards the present Trustees, as to the motives that appear to have guided them in their choice of Mr. Edkins:—nor are the facts relating to it correctly or fairly stated.

The Trustees have not, as is alleged, considered the appointment as "the private patronage of a few illiterate liverymen;" neither is it true that Mr. Edkins is the son of a Common Councilman. A relative of his has, indeed, been chosen a member of that body—subsequently, however, to Mr. Edkins having been selected, by the joint act of the Professors of University and King's Colleges from a number of highly recommended candidates as the Second Master of the City of London School. At that time no member of his family had any connexion with the Corporation. His zeal, assiduity,

and success at the head of the mathematical department in this large and important institution have guided the Trustees, most of whom have taken a part in the management of the School, in the choice they have made—and not, it is presumed, unfairly or unreasonably, although in so doing they have preferred a resident layman, wholly devoted to scentific pursuits, to his distinguished clerical competitors, and a most successful teacher to the son of an alderman. So much for this invidious imputation on the motives of the Gresham Committee. The members of the Committee may surely be justified in accepting as a satisfactory guarantee for the propriety of conferring upon Mr. Edkins the office of teaching geometry in Gresham College the remarkable success in mathematical studies of every one of his pupils who have proceeded to the universities, and the opinions repeatedly expressed by the examiners of the School, men of high reputation as mathematicians. What he may do in his Professorship remains to be seen; the Trustees from past experience have good reason to expect that he will be anxious to make it conducive to the advancement of the science to which he has been devoted.

The article concludes with a denunciation against the Corporation. "The Corporation of London is strong,—but there cometh a stronger!" Is there, then, to be more spoliation?—Is it not enough that the corrupt Ministers and Parliament of the Third George plundered Gresham College of its revenues, so that only 500*l.* a-year are paid by Government for Gresham Estates which would now let for 5,000*l.*, leaving what more is requisite to be defrayed by the Corporation and the Mercers' Company? If, therefore, "there cometh a stronger" to seize on the trust, the greater part of the funds which should have supported the College will be found to have been applied by Government to the Excise Office; and the new College has been built and is supported, not with the funds of the Trust, but with those of the two corporate bodies to whom Gresham confided it.

CANDIDUS.

*** The Gresham case has so very bad a look, that many persons might suspect our account to have been distorted or coloured. We are, therefore, well pleased to see the other side: and we can assure our readers that the name of our correspondent, if we were at liberty to give it, would be a guarantee for the above answer being the best that could have been given.

We will consider, then, the various points of our correspondent's letter. First, we are stated to have alleged that the Trustees "considered" the appointment as private patronage. We merely said that they had *made it so*. We never doubted that they would have good words in their mouths about the duties of their trust. Next, it appears that Mr. Edkins is not the *son* of a common councilman,—but some other relative. Our correspondent further states that this gentleman has been preferred to the son of an alderman:—we were aware that he was preferred to the son of Alderman Gibbs. Throwing such matters as these aside, the long and short of our correspondent's argument is, that Mr. Edkins has made a good teacher of such elements of mathematics as are learnt in a boys' school. This is the last kick at poor Gresham College! That the chair founded for the advancement of learning among educated men, and filled in their time by Briggs and Wren, should be considered as worthily occupied by a person who has given no proof, either in his college degree or in his subsequent career, of having ever attended to the higher branches of his subject, because he has been a good teacher in a boys' school—is the finish. It is true that there are, and have been, teachers in schools who have made themselves known by the fruits of their leisure: but we have yet to learn that Mr. Edkins is one of those.

In his grasp at every twig, our correspondent has laid some stress upon the fact of a layman being preferred to clerical opponents. Now first, Mr. Potts, the most *geometrical* of the rejected candidates for this chair, is a layman: and Mr. Moseley and Mr. Cowie, though clergymen, have not cure of souls, but are connected with education, as Mr. Edkins is—Mr. Moseley being an inspector of schools, and Mr. Cowie the head of the College of Engineers. Our correspondent has volunteered the information that Mr. Edkins is "wholly devoted to scientific pursuits."—What has he done?

As to the questions about spoliation, our correspondent is altogether wrong. When we hint at a power which shall prevent the Gresham appointments from being private patronage, he asks if there is to be more spoliation? We answer, yes, if by spoliation be meant restoring the College to its pristine state and intended use, in so far as its remaining funds will serve that purpose. We disapprove of the "plunder:"—but we are quite sure that neither Ministers nor Parliament would have dared to touch the Gresham fund if the Corporation had kept the college in activity. A highwayman who stops a runaway clerk, and makes him give up the assets with which he is taking himself off to America, is a robber:—but we do not feel so much concerned at the clerk's loss as we do at that of his master.

We have taken the liberty of striking out a parenthesis in our correspondent's letter, wherein he alludes, by name, to a gentleman whom he alleges to have recommended Mr. Edkins to his post in the City of London School. We do not desire to give occasion to further correspondence. Possibly the gentleman so alluded to might write to inform us that he considered the second mastership of a school and the Gresham professorship two very distinct things.

OUR WEEKLY GOSSIP.

On the 12th inst. died Mr. George Stephenson, the author of the railway system, the first great practical improver of the locomotive steam-engine, the inventor (cotemporaneously with Davy) of the safety-lamp, and a man who displayed a vigorous and original genius in everything which he undertook. He was born on the 9th of June, 1781, [was consequently, at the time of his death, in his 68th year] at a little village near Newcastle-on-Tyne, of parents in the humblest rank of life. His first occupation as a boy was attending to the steam-engines used at the mouth of coal-pits. Eventually, he became a coal-viewer, or surveyor and overseer; and distinguished himself in the coal district by an improved mode of carrying on some great works at Darlington. In 1812, a committee which had investigated the priority of the claims of the discoverers of the safety-lamp gave him a public dinner at Newcastle, at which he was presented with a silver tankard and a purse of a thousand guineas. In returning thanks he announced his intention of devoting that sum to the education of his only son, Robert, at the University of Edinburgh. The history of his employment to construct the Stockton and Darlington, the first public railroad, and the Liverpool and Manchester, the first on which locomotive engines were introduced for the conveyance of passengers,—is well known. From the first journey of the locomotive built by the Stephensons over the railroad constructed by them, dates the actual commencement of the greatest mechanical revolution effected since the invention of the steam-engine by Watt. Though self-educated,—scarcely educated at all beyond reading and writing until he had attained manhood, Mr. Stephenson took every opportunity of impressing upon the young the advantages of science and literature. He related at a public dinner at the opening of the Birkenhead Docks how, in his early career, after the labours of the day, he used to work in the evening at mending watches and clocks in order to earn enough to send his child to school. He was the founder and first president of the Society of Mechanical Engineers; and was never better pleased than when assisting by his advice and encouragement the ideas of ingenious artizans. In agriculture and horticulture he made many curious and successful experiments,—and the study of geology was a passion with him. It is feared that the intermittent fever of which he died was occasioned by the damp miasma arising from the fertilizers which he employed with great success in his hot-houses. In a brief and hurried notice it is impossible to do justice to so remarkable a man. In the words of a cotemporary writer: "His mechanical genius was of that order that it may without exaggeration be asserted that if Watt had not previously invented the steam-engine he was capable of achieving it. Others before him had prepared the way; others since have contributed valuable improvements in detail; but to George Stephenson unquestionably belongs the proud title of the Author of the Railway System. He gathered the many threads of ingenuity and enterprise, and weaved them into the wide-spreading net-work which promises, in its manifold extension, to envelope the whole world in bonds of commerce, civilization, and peace."

The Mint Commission is actively engaged in making the necessary inquiries into the constitution and abuses of that establishment. Meanwhile, it is gratifying to state that the company of Moneyers will cease with the present inquiry; and that the Master of the Mint announced the other night in the House that the changes recommended by the Commission will effect a saving of at least 10,000*l.* a-year.—We may add while on this subject, that Mr. Shiel in his recent evidence before the Committee on Miscellaneous Estimates quotes the opinion of Mr. Hawkins of the British Museum that "our coins are very imperfectly executed"—and the contradictory opinion of Col. Forbes of the Calcutta Mint, and one of the Commission, "that the workmanship of our coins is very good." Mr. Hawkins speaks like a collector for a museum cabinet.—Col. Forbes with a view to the particular object for which our coins are struck and the security we possess that they cannot be forged. Both are right, notwithstanding the apparent contradiction.

The memorial for which we have prepared our readers praying for a royal commission of inquiry into the best methods of securing the improvement of the Universities of Oxford and Cambridge, which had been signed by nearly 300 graduates and former members of those Universities, as well as by some of the Fellows of the Royal Society, was, we learn, presented to Lord John Russell some weeks ago, by Mr. Lyell, accompanied by a deputation. Mr. Lyell, a contemporary reports, observed that the study of many important branches of knowledge, both moral and physical, especially the more progressive ones, now nominally taught at Oxford, had of late been virtually abandoned; chiefly because, according to the present system of examinations, no proficiency in those sciences could lead to distinction in that University. The classes of experimental philosophy, comparative anatomy, chemistry, geology, botany, modern history, political economy, and many others, were nearly or wholly deserted. The colleges, by dividing the students into many distinct sections, were unable to furnish and support an adequate staff of able and permanent teachers, each devoted to one department; and lastly, in times comparatively modern the clerical body had engrossed an increasing and undue share in the management of academical tuition.—Mr. E. Bunbury, after adverting to the existence at Cambridge of the same evils as those indicated by Mr. Lyell at Oxford, pointed to the great disproportion between the funds of the University and those of the colleges as one of the principal causes of the undue preponderance of the latter,—and drew attention to the constitution of the academic body itself as opposing great obstacles to the introduction of necessary reforms, especially on account of the absolute veto possessed by every member of the Caput, and the want of all power of discussion or amendment of graces in the Senate. He stated at the same time that the immediate object of the memorialists was not to urge specific measures of reform, but to obtain a preliminary inquiry by means of a royal commission.—Lord J. Russell promised the matter his serious consideration; and adverting to the variety of opinions entertained as to the best modes of reform, admitted the necessity of the reform itself.

The printed books and the almost invaluable collection of Irish MSS. at Stowe will be sold, not by Messrs. Christie & Manson, but by Messrs. Sotheby & Wilkinson. A portion of the MSS. at Stowe was examined by Lord Nugent when compiling his Memorials of Hampden and his Times,—but his lordship, it is understood, made only a cursory examination. Many of the real treasures have only recently been discovered. A careful catalogue by competent persons would materially assist in realizing those high prices which the Duke's creditors are anxious to obtain.

A correspondent of the *Builder* asks,—"What, in the name of fortune, has become of the project for

the erection of a monument to Caxton in Westminster? Surely after so brave a commencement it cannot have been allowed to drop? Perhaps one of the movers will favour us with a reply. There has been bad management somewhere. The steam which was got up at starting has not been turned to good account."

The *Manx Sun* announces, in allusion to the newspaper manufacture in the Isle of Man (for importation into Britain and her colonies, in evasion of the stamp and other duties) with which we have already acquainted our readers,—that government has at length determined to make seizure of all such publications; and the collector of Douglas proceeded a few days since to put that intention into practical effect.

A correspondent, writing to us about Glendalough, with its seven ruined churches and very perfect round tower, says—"It is greatly to be lamented that the Irish Archæological Society do not endeavour to preserve these ruins from Time's gnawing tooth—or, worse still, the hand of the spoiler. The beautiful arch through which the ruins were formerly approached has recently crumbled to the ground; and various portions of the churches are in so tottering a condition that a few years must witness their downfall unless some protecting hand be held forth to save them from utter ruin. The round tower, too, one of the most interesting of those mysterious monuments of the past which dot the surface of Ireland, is equally uncared for. Ragged urchins sport around it, and having displaced several of the stones, manage to climb to a great altitude up its dilapidated side. I am much surprised that Archbishop Whately, who is stated to be a zealous antiquary, should allow these things to be. It is not generally known that the Archbishop presides over the see of Glendalough as well as that of Dublin. St. Kevin, who founded the monastic establishment of Glendalough, was Abbot of that place and Bishop of Dublin. In the year 612 he resigned the care of the bishoprick, and attended solely to the duties of his abbacy; which he performed with great zeal until his decease, in 618. The see of Glendalough continued, under a regular succession of bishops, to flourish for 600 years; when, on the death of William Piro, in 1214, it was united to the see of Dublin, at the suggestion of Cardinal Paparo, who had delivered one of the palls to the metropolitan bishop,—and this union was confirmed by Pope Honorius, in 1216. The sept of the O'Tooles, however, could never be induced to acknowledge the authority of English Archbishops of Dublin; but was still governed by Irish Bishops of Glendalough for many years till 1497,—when Friar Dennis White, the last bishop, formally surrendered possession of the see of Glendalough, and the authority of the Archbishop of Dublin was fully acknowledged. Thus, the present Archbishop of Dublin is Bishop of Glendalough; and when we remember that this secluded valley was once a celebrated seat of learning and ecclesiastical authority, it appears a pity that some pains are not taken to preserve these interesting vestiges of the past."

It is not many months since we recorded [*ante*, p. 15] the hopeless condition, at Stockholm, of the great chemist Berzelius (there, by an erratum which we did not correct at the time because the context was itself a correction, called Cornelius);—and gave a picture of the dying philosopher between the worldly honours that knocked at his sick-chamber door and the awful Presence that made them vain, calmly surrendering up his remaining hours to the cause which he had served through life, and pouring out a last contribution to Science from the "golden bowl" which was about to be "broken." With a body held in the bondage of paralysis, his mind was intent on the completion of an unfinished work which his secretary took from his mouth, and on the experiments necessary for its proof which were conducted under his direction. The dying scene has reached its conclusion—and so we hope had the work. As the life had been prolonged so much beyond the menace of that period, it is probable that the labour on which the philosopher even then saw it reasonable to employ himself has now had ample time for its accomplishment. The illustrious chemist died on the 7th instant.

Closing of the present Exhibition.

BRITISH INSTITUTION, PALL MALL.

The Gallery, with a Selection of Pictures by Ancient Masters and Deceased British Artists, is OPEN Daily from Ten till Six, and will be CLOSED on SATURDAY, Sept. 2.—Admission, 1*s.*; Catalogue, 1*s.* WILLIAM BARNARD, Keeper.

ERUPTION OF MOUNT ÆTNA.

NEW EXHIBITION at the DIORAMA, REGENT'S PARK, representing MOUNT ÆTNA, in SICILY, under three aspects—Evening, Sunrise, and during an Eruption; and the INTERIOR of ST. MARK'S at VENICE, with two effects—Day and Night. During the latter, the Grand Machine Organ will perform. Open from Ten till Six.—Admittance, 2*s.*; Children under Twelve Years, Half-price.

ROYAL POLYTECHNIC INSTITUTION.—Most important LECTURE, by ISHAM BAGGS, Esq., on ASIATIC CHOLERA and its dependence on the ELECTRICAL STATE of the ATMOSPHERE, with New and Practical Suggestions for its Treatment, on Monday, Wednesday, and Friday, at Two o'clock, and in the Evenings of Tuesday, Thursday, and Saturday at Nine. POPULAR LECTURES by Dr. RYAN and Dr. BACHHOFFNER. Dioramic Effects are exhibited in the New Dissolving Views, which, with the Chromatrope and Microscope, are shown on the large Disc. Experiments with the Diver and Diving Bell. New Machinery and Models described.—Admission, 1*s.*; Schools, Half-price.—The New Catalogue, 1*s.*

FINE ARTS.

FINE-ART GOSSIP.—The first week's sale at Messrs. Sotheby & Wilkinson's of the Pembroke Collection of coins and medals realized 3,600*l.* The following were highly considered and produced great, though not extravagant, prices. Cynetreth, the Queen of Offa, (31*l.*); Wiglaf, (30*l.*); Sitric, (40*l.*); Eric (17*l.*) The latter coin, as well as many of the Saxon period, was bought for Dr. James Bird, late Physician-General at Bombay—a purchaser likewise of many fine gold Roman and other coins from this collection. The British Museum purchased many of the rarest Saxon, English, Greek and Roman coins. Charles the Second's Petition Crown, though not as fine as the Durrant's, sold for 135*l.*—a good price. The gold ducat, or satirical medal of Lewis XII. "perdam Babylonis nomen" (with reference to Rome,)—struck at Milan, and mentioned by Pinkerton, and more particularly by Bossi in his excellent Italian translation, with notes, plates, &c., of Roscoe's works—was probably overlooked amongst the multiplicity of rarities, as it sold for a moderate price (8*l.*) We admired a fine and rare gold coin, called the Chaise, of Edward the Black Prince, which sold for only 17*l.* 10*s.* A very rare "Angelot" of Henry VI. produced but 2*l.* 3*s.* A penny of Charlemagne, struck at Bonne, was obtained at 5*l.* 2*s.* 6*d.* It is valued much more highly in Germany and Italy. Our institution does not possess one. Most of the Greek coins in bronze being inedited, sold very high. All the primitive "æs grave" copper coins of the Romans brought good prices. They were in general fine and rare;—especially the Quadrussis, of very excellent bronze, and worth from 30*l.* to 40*l.* It is a more satisfactory Quadrussis than the other three or four known in English collections. The Roman gold medals sold extremely well,—being all fine; and were chiefly bought for, or by, our own collectors. A most rare silver medallion of Cosmo, the great banker and merchant, bearing his portrait with cap, &c., as on his tomb in the Duomo at Florence, and with the title of PATER PATRIÆ, given to him a short time previous to his death, being overlooked, sold at a very low price. We know only another specimen of it—not finer—in the Ducal Gallery at Florence. A very rare silver medal, most probably of Julius the Third's time (1550-1554), relating to the vainly attempted re-establishment of the Roman Catholic faith in Great Britain during Mary's reign, sold for only 5*l.* We expected it to produce 10*l.* 10*s.* or more. The rare medal on the Massacre of the Huguenots brought 4*l.* 4*s.* In conclusion, we noticed particularly an enamelled medalet of Rodolphus II., the patron of Fine Arts in Germany: one of Luther by Albert Dürer,—at least so the catalogue states. A fine but common Didrachm of Leontius, which nevertheless brought 9*l.* A Cornuficia in gold, 14*l.* 5*s.* A rare Tetradrachm of Byzantium, bought for 17*l.* An undoubted coin, in silver, of Odessus; two beautiful and rare silver coins of Audoleon, King of Pæonia; a perfectly genuine silver Denarius of the Scribonia gens, restored by Trajan; an equally authentic Denarius of the rare Statia family (worth 15*l.*), bought by Commander Bourgeois, a French gentleman. A gold Aureus of Galba, restored by Trajan,—perfectly free from suspicion; as was the rare one of Vespasian, with reverse a trophy and "DE . JUDÆIS;" and the fine and rare Plotina, all in gold. One of the most beautiful Greek coins of the sixth day's sale was a gold Pyrrhus, King of Epirus. It produced 23*l.* 10*s.* We are happy to state it remains here in one of our choicest private cabinets, though it was much desired by continental "*virtuosi*":—from many of whom, we believe, Mr. Curt had received very high commissions. The numismatic season concludes with a sale (21-25th inst.) of fine and rare Roman coins, ancient glass and bronzes, recently brought from Rome, &c.

Mr. John Burnett, the eminent engraver, is busy with a quarto volume about Rembrandt and his books—comprising some account of his life and a critical examination into his principles and practice. A few copies, it is understood, will be worked off showing the *burr* as it exists in the first states of several of his rarest prints in the British Museum.

It is of the utmost importance that the Trustees of the British Museum should be careful—if possible, certain—about the value and importance of collections which they recommend the Chancellor of the Exchequer to purchase in the name of the nation. Some of their recent recommendations have been rather hardly dealt with by the House of Commons' Committee on the Miscellaneous Estimates. The Committee report "that the anxiety of the Trustees should be controlled by the constant attention of the Treasury:" but at first, as appears from their printed proceedings, the paragraph ran—"The Committee view with a little suspicion the natural anxiety of the Trustees to possess themselves of rare objects; especially when after urging so strongly upon the Chancellor of the Exchequer the outlay upon Baron Verstölk's collection, as the only probable opportunity of completing the prints at the Museum, in March—they withdrew that application in favour of the collection of Lord Aylesford, purchased by Messrs. Smith, for such good reasons, in June." There was a division on the subject,—and the paragraph in full as printed above was negatived in Committee. The sting, however, remains—not we trust without its use—in the printed proceedings.

The restoration of the Church of St. Nicholas, Great Yarmouth, is now so nearly completed that the building will re-open for divine service on the 24th inst. The unsightly galleries and other deformities by which it was formerly incumbered have been entirely removed; and the high-backed, square-seated, and other pews have given place to sittings of uniform size, which will accommodate a much larger congregation. The two columns which had been removed from the nave, and by which the fabric was much weakened, have been rebuilt,—and the four Early English arches destroyed by such removal have been restored. The whole area west of the chancel has been thrown open,—the roofs of the nave, south aisle, and north and south transepts, re-decorated,—the arches under the tower thrown open and restored,—their piers partially rebuilt,—and the ceiling of the intersection elevated about twenty feet. The north transept (which was in a very ruinous state) has been entirely rebuilt, and a new early-decorated window has been inserted. The new sittings are entirely of oak,—many of them with handsomely carved finials; and the fronts of the official seats are richly pannelled.

A bit or two of fact and rumour, metropolitan and provincial, may have a common paragraph of a few words.—A premium of 100 guineas, or the usual commission, has been offered for the best designs for a public cemetery at Leicester; any other design to be purchasable by the committee for not more than 20 guineas.—Capt. Siborne's Model of the Battle of Waterloo has been presented to the United Service Institution—where we wish it a better fate than Mr. Claxton's picture of the Burial of Sir John Moore. A new room is, it is said, to be formed in the upper part of the building, to be devoted to the model and other memorials of the event which that records.—The *Chester Courant* says, we know not on what authority, that the Colosseum is about to be removed from London to Birkenhead.—A Master Builders' School of Architecture has been opened at Sheffield.

MUSIC AND THE DRAMA

ROYAL ITALIAN OPERA, COVENT GARDEN.—'Guillaume Tell' has never been a fortunate opera in England. When it was brought out nine years

ago by M. Laporte [*Athen.*, No. 611] we hinted at some of the causes of its imperfect acceptation: the feebleness of the *libretto*, the want of female interest, and the tediousness of the third and fourth acts,—which has led, in Paris, to most important omissions and retrenchments. Yet, musically, there is nothing in 'Les Huguenots' to compare with the second act—chorus, *romanza*, duett, *terzetto*, and grand *finale* forming a series of movements, singly and collectively, not to be exceeded for beauty, fantasy, science, and knowledge of the stage. Where else exists there such a piece of *ballet*-work as the *pas de trois* and *Tyrolienne?* Or what can be lovelier in character and colour than the overture and introduction to the opera with the *Ranz des vaches* so excellently interwoven?—than the music of the escape scene at the close of the first act?—than the grand tenor *scena*, 'Asile héréditaire'? It is vexatious that a work so rich to overflowing in all that can delight and satisfy should suffer in consequence of Rossini's indifference to interest of story. As with the 'Flauto Magico' of Mozart, every one owns the rare worth and beauty of 'Guillaume Tell;' but few can sit through it without great and painful weariness—unless a Duprez come to end it triumphantly with his '*Suivez moi*,' or a Taglioni don the Swiss girl's boddice to enchant every one by her grace in the *Tyrolienne*. At the *Royal Italian Opera*, in spite of the orchestral and choral perfection with which it was given, the opera found its usual fate this day week. After 'Les Huguenots' it *could* hardly have pleased under any circumstances:—but in the present case, the cast was not strong enough to force a success. Signor Tamburini cannot fill the part of *Guglielmo*. It was said in the house that M. Roger (the *Arnoldo*) was severely indisposed,—and therefore we will not from this performance decide on his chances of occupying well the throne vacated by Rubini and Duprez. Madame Castellan, again, though correct and improving, fails in the grace required by music written expressly to exhibit the graceful Cinti-Damoreau. The work, we repeat, was, in every respect, given too late.

OLYMPIC.—On Monday was produced a melo-drama, by Mr. Shirley Brooks, entitled 'The Magician.' The hero is none other than *Pedro of Aragon* in disguise; who performs here the part usually attributed to *John of Procida*,—and for the sake of the Sicilians undergoes torture, toil, suspicion, and mortal peril, until the fatal catastrophe of the Vespers arrives and consummates the destruction of the French. The part was performed by Mr. Emery, with vigour and point. *Charles of Anjou* (Mr. Norton), the next character of interest, is tolerably well drawn. A princely indifference to morality and mercy has some telling power, and reconciles the audience to his treacherous death by means of a poisoned ring, the venom of which enters his system while clasping the hand of a crusader, *Count Albert d'Anglade* (Mr. Leigh Murray). That this important event should take place without the connivance of the *preux chevalier*—should be on his part an accident, and yet that accident be so well provided for by the guilty agents in the business—is one of those improbabilities which, though common in melo drama, are not permitted to the legitimate play. Allow this kind of drama to become popular, and we must make up our minds to abandon all the severer canons of criticism.

A new farce, by Mr. J. P. Wooler, entitled 'Pounded on Facts,' has also been produced here,—in which Mr. Compton performs the part of a *Mr. Skeptic*. The character is a clever exaggeration; and the ludicrous situations are produced by his unwillingness to admit any fact, however plain—to take anything for granted, even the names of his intimate acquaintances. Perplexity and confusion arise out of this foible,—further increased by a little plot got up by his wife to convince the doubter of his folly. This is a very lively affair—provocative of continued laughter, and meriting the success which it has achieved.

MUSICAL AND DRAMATIC GOSSIP.—Scarcely a week has, of late, passed without the question of musical copyright coming before our judges in some form or other. To report upon each of these, with all its turnings and windings, "excels our power." The right of property is by no means so easily established as would appear possible to those who have never entered upon the subject. Why melodies should be protected and words *not*—where the line is to be drawn betwixt the stage representation which can be prohibited and the song which is free to all—to what extent publication gives the privilege of performance—are all points which are anything rather than finally adjusted. But the adjustment is rendered difficult by the imperfection, if not "confusion prepense," with which what is called scientific evidence, is tendered on these occasions. In the *verbatim* report of the recent trial of Boosey *v.* Purday, we have been struck by the absence of precision in the drawing of certain distinctions in themselves simple enough. The Lord Chief Baron was anything rather than lucid in his charge,—not seeming with any courage or decision to distinguish between a reproduction of the separate pieces of the opera, making up the entire work, (which we should call direct interference, if not piracy), and the selection of a single theme or series of melodies as subject or subjects for variations, which is simply quotation. Nothing can be imagined much less calculated to enlighten the understandings of a jury than such explanations as the following:—

> The clerk to the plaintiff's attorney then produces the books: on the 14th of May, this publication, which contains twenty-two airs. Mr. Harris, the professor of music, looks at the book produced by Mr. Panizzi from the British Museum. Now I am coming to that part—that this book, which contains the 'Bluettes,' marked A, contains 'Vi ravviso,' and it is found in the airs contained in the book produced by Mr. Panizzi. He looks at the German edition of the opera bought of the defendant; he says, 'Vi ravviso' is there. He says this book contains the whole opera: I do not understand German; the music is the same. The 'Vi ravviso' is the same, founded on it. The divertimento is founded on the air called 'Vi ravviso,' as a text on which a sermon is preached. He then compares the two copies of the books. He says one is a copy of the other. He says the 'Bluettes' contains the two decided movements of the 'Vi ravviso,' which movements in his judgment constitute the air. He says the melody is preserved. The German edition contains the air or melody, but without those additions, which additions are made by Schmidt. Now, upon that, the only remark I can make to you is this: that, just as in the case of an invention, if a man has obtained a patent for an invention, that is not to tie up the faculties of mankind with reference to every possible circumstance that might take place.....I don't understand much on the subject of divertimentos; and how far taking a popular air, and playing it with a number of variations, in a manner in which certain skilful players on particular instruments—the manner in which they exhibit their skill, is to select some particular air—some favorite air;—they play it in a variety of ways, and after running backwards and forwards, show you how you may expand it or amplify it; and it all comes back again to the simple air, I don't think that it is necessary for the infringement of the right of the person, to publish the air itself. The question is this: whether you regard this as a new work arising out of the old air of Bellini: whether you regard this as a new composition; and one of the fair modes of looking at it is this: is this meant at all to interfere with the copyright, or is it not taking up a subject? As, if a man should make some discovery upon some new branch of science, and publish it to the world, another person takes up a portion of it, amplifying it and discussing it. Whether those are applicable to a piece of music I don't know.

The inconvenience arising from matters in dispute, thus argued being decided by a jury neither professional nor artistic suggests the expediency of all who are either commercially or merely sympathetically interested in Music combining as often and as far as may be possible for the purpose of placing their interests on a better footing among themselves, and in a clearer light before those who are called in to adjudicate in cases of dispute.

M. Janin writes with a sort of hysterical hopefulness of the Parisian *spectacles*. Last week he was sparkling away

> according to his best endeavour,

in praise of sundry novelties:—'Les Portraits,' a one-act trifle at the *Théâtre Français*—'Oscar XXVIII.' at *Les Variétés*, in which a new actress has appeared, Mdlle. Helena, very nearly as charming as Mdlle. Jenny Colon was in her spring—'Une Chanie Anglaise' at the *Théâtre Montansier*—'Van Dyck à Londres' at the *Odéon*—'Le Morne au Diable,' a melodrama at the *Ambigu Comique*. The *Théâtre Beaumarchais*, too, in the heart of the Faubourg St. Antoine has been re-decorated, and opened under a new management—that of M. Jouy *fils*. A shapeless, vulgar, intolerable thing called 'Tragaldabas' has been played somewhere—cut up by everybody; and M. Janin makes mirth (as has been said, somewhat hysterically) over its author's wrath against the *feuilletonists*—himself in particular. We also perceive that the *Théâtre Historique* has been taking not merely to the musical and romantic, by performing the 'Atala,' announced a week or two since—but, also, to "the genteel;" 'Le Chandelier,' a sentimentally-comic sketch by M. Alfred de Musset, having produced a "sensation" there. By the way, the story of the *proverbes* of M. Alfred de Musset, which are now so universally in vogue, is singular. They were many—if not all—of them published in the French periodicals some dozen years ago: from which it would almost appear that, then, they were conceived to be unrepresentable on the stage. Now, they are eagerly sought for on every hand.

The Committee of the Brompton Hospital for Consumption, so munificently assisted by Mdlle. Jenny Lind, has subscribed for a silver salver with an appropriate motto—which has been presented to the Lady in commemoration of her benificence.

A pianoforte has been exhibited in London by M. Scherr, of Philadelphia: in which the attempt to conciliate the form of the square with the power of the grand pianoforte has been once again made with tolerable success. The instrument is easy in its touch, and its tone is brilliant, though thinner in quality than we English altogether like. The register, too, is fairly even,—a *desideratum* not attained in many of the new inventions. M. Scherr, who belongs to Denmark, must hardly look to putting our own "trusty and well-beloved" makers out of court; but his work seems to be conscientiously and solidly executed—and creditably to illustrate the musical requisitions of the country of his adoption. No pianofortes sent out from Europe abide the climate of the New World.

It is now said, that Mr. Bunn's arrangements for English opera during the winter at Covent Garden are taking a certain form. We have just learnt that Mdlle. Nissen has been caught flying for his *prima donna*, on the *proviso* that she is to sing in English,—that he is negotiating for Miss Hayes—and that a new opera by Mr. Wallace and another by Mr. Balfe are to be given. We would fain hope that the days of spectacle-dramas stuck full of ballads are not about to return: though, betwixt managers and music-sellers, the composer writing for England is sadly trammelled, neither party having as yet sufficient trust in the public—nor sufficient comprehension of its wants, and the healthy manner of satisfying them—to care for anything beyond the *encore* (which implies the profit) of the moment! But a few words of general comment and counsel, on the subject of managers and artists, are in reserve:—to be offered at no very distant day.

EIGHTEENTH MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

[*From our own Correspondents.*]

THE order of proceedings at this Eighteenth Meeting of the British Association has been the same as on former occasions—varied only by such arrangements as the particular locality suggested, and by some change in the disposition of the Sections. Section E, which was formerly devoted to Physiology, has been united with Botany and Zoology to form Section D, formerly confined to the latter two: and Ethnology, now constituted a Sub-section of the new member, thus remains attached to the same Section.

The summary of proceedings at the Meeting is as follows:—On Wednesday the General Committee assembled—as we last week recorded.—On Thursday, business began in all the Sections—the Ethnological Sub-section forming the only exception: and in the evening Dr. Percy delivered a discourse on smelting iron in the Baptist Chapel.—On Friday all the Sections again met, except the Ethnological; during the afternoon there were sailing matches and boat races; and after the ordinary, Mr. Vivian threw open his grounds,—but the wet weather interfered with the general enjoyment of the privilege. On Saturday there was no meeting in the Sections: and a very large party set off at eight in the morning to visit the iron works of Ystalyfera, and other points of interest in the Swansea Valley. At the former, which was the principal point of attraction, nearly two hundred members of the Association had the satisfaction of witnessing the casting of a large quantity of pig-iron, and of examining the appliances by which the economy of fuel, by the use of the gaseous pro-

ducts of the combustion (hereafter more particularly referred to in our report of Mr. Budd's paper read the previous day in the Chemical Section) is effected. Another party made an excursion to the bone caves and cliffs of Gower:—while a third, consisting of Lord Wrottesley, Sir Philip Egerton, Sir Henry De la Beche, Prof. Owen, Prof. Forbes, Dr. Carpenter, Mr. Bowerbank, Lieut. Spratt, and Mr. Jeffreys, went with Mr. M'Andrew in his yacht the Osprey, on a dredging excursion in the Bristol Channel. Several marine animals, including the *Velella limbosa* were thus procured alive for exhibition to the Zoological Section. Some of the Botanists, with Mr. Babington at their head, made an excursion round the coast from Oystermouth to Pennard Castle, where they obtained many of the rare plants of this part of Wales;—amongst others, the *Diaba aizoides*, from the latter locality. The less energetic visited the zinc works of Mr. Vivian,—and spent the remainder of the day in Mr. Llewellyn's grounds of Penllergare. Here a boat impelled by the electrical current was at work on one of the lakes. In the evening, there was a promenade at the school-rooms—very fully attended.—On Monday, there was business in all the Sections,—and the General Committee again met. Lieut. Carte exhibited his rockets at the pier. He demonstrated their usefulness by firing over a vessel moored at some distance,—when two men, attaching themselves, were drawn ashore. In the evening, Dr. Carpenter lectured on microscopic structures to a large audience.—On Tuesday all the Sections again met: and the Mayor gave a dinner to the principal strangers. In the evening there was a promenade; at which were displayed such objects as had proved of interest in the various Sections.—On Wednesday some of the Sections met: and the General Committee assembled to sanction the grants which had passed the Recommendation Committee. In the afternoon of the same day, the concluding General Meeting of the Association was held, for the customary ceremonial proceedings.—The meeting has been on the whole a good one:—but the wetness of the weather has interfered greatly with the comfort of the visitors and prevented their full enjoyment of the interesting features surrounding Swansea.

The following is the General Treasurer's account, laid before the first meeting of the General Committee.—

THE GENERAL TREASURER'S ACCOUNT,
From 23rd of June, 1847 (at Oxford), to the 9th of August, 1848 (at Swansea).

RECEIPTS.

	£.	s.	d.
To Balance brought from last account	169	15	2
Life Compositions at Oxford, and since ..	200	0	0
Annual Subscriptions, ditto ditto	207	0	0
Associates' Subscriptions, ditto ditto ..	495	0	0
Ladies' Tickets	203	0	0
Book Compositions	2	0	0
Dividends on Stock (4,500*l.* Three per Cent. Consols)	196	12	0
From Sale of Publications, viz.:—			
Copies of 1st volume £2 10 6			
,, 2nd ditto 3 5 8			
,, 3rd ditto 2 15 0			
,, 4th ditto 1 13 4			
,, 5th ditto 1 16 10			
,, 6th ditto 2 0 9			
,, 7th ditto 3 5 0			
,, 8th ditto 4 11 0			
,, 9th ditto 5 12 0			
,, 10th ditto 4 13 8			
,, 11th ditto 3 5 3			
,, 12th ditto 2 18 6			
,, 13th ditto 10 7 4			
,, 14th ditto 8 1 8			
,, 15th ditto 62 2 0			
,, 16th ditto 10 2 10			
Lithograph Signatures	0 12 0		
British Association Catalogue of Stars	63 16 11		
Lalande ditto ditto ..	34 4 0		
Lacaille ditto ditto ..	5 1 3		
	232	15	6
Balance due to General Treasurer ..	10 13 10		
Ditto to Local Treasurer ..	3 9 5		
	14 3 3		
Less Balance in Bankers' hands ..	4 15 5		
	9	7	10
	£1,715	10	6

PAYMENTS.

	£.	s.	d.
For sundry Printing, Advertising, Expenses of Oxford Meeting, and sundry Disbursements by General Treasurer and Local Treasurer ..	448	1	1
Paid Balance of printing 15th Report (14th vol.)	81	1	7
Carried up . .	£529	2	8

			£.	s.	d.
Brought up . .			£529	2	8
Printing 16th Report (15th vol.)			508	6	2
Engraving, &c. for 17th Report (16th vol.) ..			28	0	0
Salaries to Assistant-General Secretary and Accountant			375	0	0
Paid by order of the Committee on account of Grants for Scientific Purposes, viz.:—					
Researches on Atmospheric Waves	£3	10 9			
Vitality of Seeds	9	15 0			
Completion of Catalogue of Stars	70	0 0			
Researches on Colouring Matters	5	0 0			
Acid on the Growth of Plants ..	15	0 0			
			103	5	9
Maintaining the Establishment at Kew Observatory, viz.:—					
Balance of Grant of 1846 ..	£42	11 6			
Part of Grant of 1847 ..	129	4 5			
			171	15	11
			£1,715	10	6

On Thursday evening a lecture was given in the Baptist Chapel, by Dr. Percy, as we have said above, 'On the Chemistry of the various Metallurgic Processes now practised around Swansea.'—Of course, that of copper smelting formed the main subject. In the first place, the varieties of ores employed—viz., the oxide of copper, the sulphuret and the double sulphuret of copper and iron, and the recently imported carbonates, were described. The processes of roasting to expel the arsenic and to a certain extent the sulphur, and the arrangements of the furnaces, were minutely detailed. A great number of specimens, showing every stage of the process, were exhibited. The smelting process formed the next subject of consideration; which was well described and amply illustrated. The various qualities of copper produced from different ores, and the causes of the differences as far as they are known, were examined. In addition to the ordinary processes of reduction, the recent process patented by Mr. Napier, in which the ore is reduced by taking advantage of the chemical affinity of iron for the sulphur of the ores, was described. It was thought to possess many advantages, and the copper produced by the process was of an exceedingly good character. A short notice was taken of the works at Ystalyfera, where anthracite is employed for fusing iron,—and the heated gases escaping at the top of the furnace are collected and employed to heat the boiler of a steam engine; by this, saving the entire amount of the ordinary fuel. In conclusion, the necessity of uniting practical knowledge and experimental science was insisted on—and the great importance of some school in which, as at the École des Mines, a good practical mining and metallurgical education could be obtained, was strongly urged. Some notice was taken of the Museum of Practical Geology; and a hope was expressed that that establishment might become a school of the kind sought,—where, under Government direction, all that was desired in this way might be effected.

The Marquis of Northampton gave the thanks of the Meeting to Dr. Percy; and then called upon Dr. Faraday and Sir H. De la Beche,—who each said a few words in favour of the suggestions of the lecturer.

GENERAL COMMITTEE.

Monday.

The Committee assembled at 3 o'clock, P.M., to decide on the place of meeting for next year. Letters of invitation were read from Birmingham, Bath and Ipswich.—Mr. Wills addressed the Meeting at some length on the claims of Birmingham; and was followed by Dr. Daubeny, who supported those of Bath—and expressed a hope that a visit to that city by the Association would not be postponed to a later period than the year 1850.—On the motion of the Dean of Ely, seconded by Mr. J. Taylor, it was unanimously resolved that the invitation to Birmingham should be accepted. The following officers were appointed:—

Dr. Robinson, of Armagh, *President*; the Earl of Harrowby, Lord Rothsay, Sir Robert Peel, Charles Darwin, Esq., F.R.S., Dr. Faraday, Prof. Willis, Sir D. Brewster, *Vice-Presidents*; J. Russell, Esq., *Local Treasurer*; W. Wills, Esq., R. Fletcher, Esq., *Local Secretaries*.

On the motion of Sir Charles Lemon, it was agreed that the next Meeting should take place in the month of September 1849,—and that the exact date should be fixed by the Council after consulting the local authorities. The Committee then adjourned till Wednesday.

Wednesday.

The Committee held their last meeting at one o'clock. There were very few members present. The Marquis of Northampton took the chair. The following were elected members of the London Council for the ensuing year, in addition to the officers who are *ex-officio* members:—Prof. Ansted, Major S. Clerke, Prof. E. Forbes, Prof. T. Graham, G. B. Greenough, W. J. Hamilton, Sir J. Herschel, Prof. E. Hodgkinson, J. Heywood, Dr. R. G. Latham, C. Lyell, L. Horner, R. Hutton, Sir R. W. Inglis, Capt. Ibbetson, Sir C. Lemon, Sir C. Malcolm, Prof. Owen, G. R. Porter, J. Scott Russell, Dr. Roget, H. E. Strickland, W. Spence, Lieut.-Col. Sykes, the Dean of Westminster, Prof. Wheatstone, Prof. Walker, Rev. Dr. Whewell.

The Auditors were appointed Major S. Clerke, J. Heywood and G. R. Porter, Esqs.

The Report of the Committee of Recommendations was read and adopted. The following were the

Recommendations Involving Grants of Money.

That Mr. Birt be requested to undertake the Reduction and Discussion of the Electrical Observations made at Kew, with the sum of 50*l.* at his disposal for the purpose.

That the sum of 100*l.* be placed at the disposal of the Council, for the expenses of Kew Observatory.

That Sir H. T. De la Beche, Sir Wm. Hooker, Dr. Daubeny, Mr. Henfrey, and Mr. Hunt, be requested to investigate the action of Carbonic Acid on the growth of Plants allied to those of the Coal-formation, with the balance of the original grant (5*l.*) at their disposal.

That Mr. Spence and Mr. T. V. Wollaston be a Committee for the purpose of assisting Mr. Newport in drawing up a Report on Scorpionidæ and Tracheary Arachnidæ, with the sum of 10*l.* at their disposal.

That Prof. E. Forbes and Prof. T. Bell be a Committee for assisting Dr. T. Williams in drawing up a Report on the state of our knowledge of British Annelidæ, with 10*l.* at their disposal.

That H. E. Strickland, Esq., Dr. Daubeny, Dr. Lindley, and Prof. Henslow, be requested to form a Committee for conducting Experiments on the Vitality of Seeds, with 10*l.* at their disposal.

That Prof. E. Forbes, and the other Members already named on the Committee for Dredging, with the addition of Col. Portlock and Dr. Williams, be requested to continue their investigations, with 10*l.* at their disposal.

That Dr. Lankester, Mr. R. Taylor, Mr. W. Thompson, Mr. Jenyns, Prof. Henslow, Mr. A. Henfrey, Sir W. C. Trevelyan, Bart., and Mr. Peach, be requested to continue their superintendence of the drawing up of Tables for the Registration of Periodical Phenomena, with 5*l.* at their disposal.

That certain Bills, amounting to 13*l.* 10*s.*, on account of Anemometrical Observations, formerly carried on at Edinburgh, be paid; and that the Anemometer be transferred to the Assistant-General Secretary at York.

Involving Application to Government, &c.

That the President and General Secretary be authorised to apply to Her Majesty's Government for the continuation of the Meteorological and Magnetical Observatory at Toronto up to the 31st of December, 1850.

Not involving Grants of Money or Applications to Government, &c.

That Dr. Schunk be requested to continue his investigations on Colouring Matters.

That Dr. Andrews be requested to prepare a Report on the Heat developed in Chemical Action.

That Mr. R. Hunt be requested to prepare a Report on the present state of our Knowledge of the Chemical Influence of the Solar Radiations.

That Prof. E. Forbes, Dr. Playfair, Dr. Carpenter, and Mr. A. Hancock be a Committee to Report on the Perforating Apparatus of Mollusca.

That Mr. Mallet be requested to continue his preparation for a Report on the Facts of Earthquakes.

That Mr. G. G. Stokes be requested to prepare a Report on Physical Optics, in continuation of Dr. Lloyd's Report on that subject.

That the Communication of Dr. Percy on the Extraction of Silver by the Wet Way be printed entire in the next Volume of Transactions.

That a Communication by Joseph Glyn, Esq., on Hydraulic Pressure Engines, be printed entire in the next Volume of Transactions.

That a Communication by Mr. J. P. Budd, on the advantageous Use made of the Gaseous Escape from the Blast Furnaces of Ystalyfera, be printed entire in the Transactions.

That the Assistant-General Secretary be authorized, on consultation with Prof. Powell, to insert in the next Volume of Transactions such portions of Prof. Powell's Communication on Luminous Meteors as may be necessary to complete the recorded observations of that phenomenon.

That the Committee appointed in 1838 for determining the resistance of Railway Trains be re-appointed, for the purpose of repeating those experiments at the high velocities and in the altered circumstances of Railways at the present time,—the following gentlemen to form the Committee, viz.:—Mr. Hardman Earle, Mr. George Rennie, Mr. Edward Woods, Mr. T. Froude, Mr. J. Glyn, Mr. Wyndham Harding, and Mr. J. Scott Russell.

That the Assistant-General Secretary be requested to form a complete List of all the Recommendations that have been made by the Association, accompanied by a Report of the manner and extent to which these Recommendations have

been carried into effect; to be printed and placed in the hands of the Committees of Sections.

The Committee then adjourned.

GENERAL MEETING.

The concluding General Meeting took place at three o'clock. The Marquis of Northampton took the chair. The Secretary stated that the tickets issued on the present occasion amounted to 847, as follows:—

Members.	Tickets.
New Life	3
Old Life	149
New Annual	23
Old Annual	51
Associates	388
Ladies	205
Foreigners	15
Reporters	13
Total	847

He also stated the number of tickets issued at former Meetings for the sake of comparison. At York (1844) 940 tickets; Cambridge (1845) 1090 tickets; Southampton (1846) 860 tickets; and at Oxford (1847) 1250 tickets; showing that Swansea, notwithstanding its inferiority with regard to population, had contributed largely to the funds of the Society when compared with most populous places at which they had held previous meetings.—Col. Sabine having read the grants of money, &c., which had been passed at the Meeting at one o'clock, the President addressed the Meeting, briefly expressing a hope that the week which they had passed was one of gratification and instruction to them,—and that many years would not elapse before the British Association would be again in Swansea,—feeling, as he did, that it would be long before the Association lost sight of the hospitality, generosity, and good feeling with which they were there received. He then, on the part of the members who had visited Swansea, expressed thanks to Mr. Vivian, the Mayor, and the inhabitants for the kindness and support which the Association received at their hands.

Mr. Dillwyn, the Mayor, and Mr. Vivian responded on their own parts and that of the inhabitants of Swansea. Other complimentary votes having been carried, and the thanks of the Meeting having been unanimously voted to the Marquis of Northampton, the meeting adjourned to Birmingham, in September 1849.

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

President—Lord WROTTESLEY.
Vice-Presidents—The DEAN OF ELY, Rev. Dr. WHEWELL, Lord ADARE, Sir D. BREWSTER.
Secretaries—Dr. STEVELLY, Mr. G. G. STOKES.
Committee—Prof. Plücker, Dr. Siljestrom, Capt. Sir E. Belcher, Prof. D. Gray, Dr. Greene, Sir W. S. Harris, Prof. Hodgkinson, Mr. W. Lassel, Dr. Lee, Dr. Lloyd, Prof. Phillips, C.l. Portlock, Messrs. F. Ronalds, J. Scott Russell, Col. Sabine, Col. Sykes, Prof. Wheatstone.

Lord WROTTESLEY, on taking the chair, briefly addressed the Section.

Mr. MALLET reported that ill health had prevented his completing the Report on the Facts of Earthquakes, entrusted to him by the Association.

Mr. MALLET also reported that the Self-registering Seismometer was not completed, though considerable advance had been made in the drawings.

'Catalogue of Observations of Luminous Meteors, from September, 1833, to July, 1848,' by the Rev. Prof. POWELL.—In the Report of the Association for 1847, Prof. Powell had given an imperfect list of observed luminous meteors, so far as he could collect them, for the years subsequent to the termination of M. Quetelet's Catalogue. With a view to enlarging and carrying on this design from year to year, he is desirous of at least forming the nucleus of a collection of all observations of this kind under the auspices of the British Association; and his wishes have been responded to by numerous correspondents,—from whose communications, and from data furnished by several journals, he had drawn up the Catalogue; which includes a few observations of earlier years, but is more full for the later, and reaches down to the present. It is offered as containing a condensed view of existing observations collected in one record. The original documents as communicated are collected in the Appendix; and references are given to the sources of information in other cases. The author concludes with hoping that similar contributions will be forwarded to Prof. Powell, at Oxford,—who will embody them in a continuation of the Catalogue at a future time. The Catalogue itself was not suited to be read in detail. It was tabulated under the following heads:—Date—Description—Place—Observer—Reference. Many of the facts in the Appendix were interesting. The Secretary selected the following as an example:—"Extract from the *Malta Mail Times*, August 18th, 1845: 'On June 18th, at 9h. 30m. p.m. the brig Victoria, from Newcastle to Malta, in lat. 36° 40′ 56″, long. 13° 44′ 36″, was becalmed, with no appearance of bad weather; when her top-gallant and royal masts suddenly went over the side as if carried away by a squall. Two hours it blew very hard from the east; and whilst the hands were aloft reefing topsails, it suddenly fell calm again, and they felt an overpowering heat and stench of sulphur. At this moment three luminous bodies issued from the sea, about half a mile from the vessel, and remained visible for ten minutes (it is not said what became of them). Soon after it began to blow hard again, and the vessel got into a current of cold fresh air.' At Ainab, on Mount Lebanon, at the same time, June 18th, at half an hour after sunset, the heavens presented an extraordinary and beautiful though awful spectacle. A fiery meteor—composed of two luminous bodies, each apparently at least five times larger than the moon, with streamers or appendages from each joining the two, and looking precisely like large flags blown out by a gentle breeze—appeared in the west, remaining visible for an hour, taking an easterly course, and gradually disappeared. The appendages appeared to shine from the reflected light of main bodies, which it was painful to look at for any time. The moon had risen about half an hour before, and there was scarcely any wind."—Sir W. S. HARRIS characterized this Catalogue as the commencement of a store of valuable facts. The account of the brig Victoria was to him most interesting. He had no doubt it was an electrical phenomenon, exemplifying what Prof. Faraday had described under the name of the glow discharge. Indeed, he had himself imitated the phenomenon artificially; and had recorded a similar fact which occurred to a vessel when sailing close on a wind under reefed topsails. They saw bearing down from windward, straight on the ship, two wheels of fire, which the men described as rolling mill-stones of fire. When they came near, an awful crash took place, the topmasts were shivered to pieces, and the crew experienced the same overpowering sulphurous stench. The phenomena were thus accounted for:—a highly-charged thunder-cloud was brought down by the wind on the ship; its distance from the sea, though beyond the striking distance, admitted of the "glow discharge," which produced the appearance of the balls or wheels of fire that so alarmed the men. When the cloud came near the ship, its masts brought it within striking distance,—when a discharge or thunder-clap took place. The sulphurous stench was a constant concomitant of such discharges.

'An Account of the Annular Eclipse of October 9, 1847,' by the Rev. Prof. POWELL.—The British Association having at the last meeting printed and circulated 'Suggestions for the Observation of the Annular Eclipse,' it has appeared desirable that at the present meeting a short statement should be made, as far as intelligence has been received. Unfortunately, the morning was cloudy over nearly the whole of that part of England in which the eclipse was annular. On some parts of the east coast of Kent the eclipse was partially seen, but not (so far as has been ascertained) in the annular phase. The chief results, bearing on the physical inquiries referred to, are as follows:—1. At Orleans, MM. Mauvais and Goujon observed, as the cusps approached, the ends extended more rapidly, but unequally, and with a wriggling motion. Then one or two luminous points (beads) detached, but melted into one again. Just before the completion of the annulus many such appeared along the limb between the cusps, more or less *extended*, but all very *thin*: they finally united. The ring did not exceed a few seconds in breadth. The dark intervals did *not* draw out into *threads*, but decreased *both in length and thickness* (this is difficult to understand). Upon the whole, they observe, the appearances were merely those of irregularities in the moon's edge, and not such as to require any supposition of *irradiation* or diffraction to account for them. ('Astron. Soc. Notices,' viii. 13.)—2. M. Schaub, at Cilly, in Styria, observed the eclipse with a telescope having a power of 40 and a red glass, and saw the annulus formed *without any irregularity*. He then applied a power of 60, and a compound glass of complementary colours, giving a white image, and noticed the lunar mountains projected on the sun's disc. The limb undulated; but continued circular up to the second contact, which was *a contact with the tops of the mountains first, leaving bright intervals*—but without distortion. (Ibid. p. 13.)—3. Capt. Jacob, at Bombay, with a 3½-feet Dollond, power 40, saw, just before the formation of the annulus, a faint light outside the cusp. At the south cusp a break, as if from a projection on the moon's limb, which increased to about 1′ in breadth, attaching the limbs; then elongated, and suddenly broke—the ends being jagged. At the termination of the annulus a portion of 30° on the limb was suddenly occupied by beads, too many to count, but which lasted only two seconds. No light was seen about the moon off the sun. (Ibid. p. 27.)—4. Major Lysaght, at Hingolee, with 3½-feet Dollond, power 25, and glass giving a greenish-yellow image, saw, near contact, the limb undulating, the edge "hillocky"; which appearance subsided, till just at contact a dark band from one "hillock" connected the limbs, followed by another: the mode of its disappearance was not noticed. As the ring increased in breadth, the limb of the moon became "pinnacled," and a blaze of light appeared on it (this part of the description is obscure). Then the limb became smooth again, except one hillock, which elongated and formed a connecting band, as at first, and then broke in two (this circumstance seems extraordinary, but is not further explained.) (Ibid. p. 130.)—5. Dr. Forster, at Bruges, states that he observed a remarkable luminous arc or ridge of light, differently coloured from the rest of the sun, extending along and immediately on the limb of the moon, between the cusps. It lasted nearly five minutes. He considers it as unlike any appearance described before—and remarks that it appeared *as if* produced by a lunar atmosphere refracting the light of the sun; but the rapid transit of flying clouds prevented any accurate observations. It was seen with a telescope of low power. Perhaps this was the same with the blaze of light described by Major Lysaght.

'An Explanation of the "Beads" and "Threads" in Annular Eclipses,' by the Rev. Prof. POWELL.—The principles on which this explanation is suggested are the following:—1. The fact established by Mr. Airy that the intensity of the sun's light increases rapidly from the extreme edge of the disc to some short distance inwards.—(See 'Ast. Soc. Notices,' vol. v. p. 216). 2. The admitted law that *irradiation* increases with the intensity of the light. On these grounds, when the irregularities of the moon's edge have their summits beyond the limb of the sun, but their depressions within it, so that they leave patches of light, these will be *enlarged* by irradiation, and will be *much more enlarged* as the depression is deeper within the sun's limb, when the light is so much more intense; it will thus appear elongated in a direction perpendicular to the limb, if actually broad at the top and shallow. When the summits come within the limb then by the same causes they will be melted down, or at least be reduced to their natural proportions. But the encroachment of the solar light on the dark disc will be greater towards the sides where it is at a greater depth from the edge of the sun, and there will be thus a general protuberance towards the point of contact. As to the cause of the diminution of the sun's light at the edge, we are in entire ignorance:—it may be liable to vary under different unknown conditions. Again, dark glasses by diminishing the light may destroy the effect of irradiation, and the power and aperture of the telescope are known greatly to influence its amount. Hence it is quite conceivable that under different conditions the phenomena may be greatly modified or may not appear at all. In the annular eclipse of October 9, 1847, it appears that only small beads were noticed by some observers, and something like one or two threads by others.

Sir D. BREWSTER observed on the paper, that it was not a legitimate conclusion that these beads or threads, or the projection of stars on the dark limb of the moon, were either the results of a lunar atmosphere, of diffraction, or, in fact, were lunar phenomena at all, as long as we found that different ob-

servers, all looking at the moon at the same time and under similar circumstances, saw such dissimilar appearances. If all that were watching the same event under equally favourable circumstances reported exactly the same appearances, he would then consider the inference legitimate. At present, when of observers even in the same room and using similar instruments, some saw while others did not these appearances, in his opinion we must look for the origin of them in those atmospheric currents, or differences of density, or other circumstances, which we knew existed,—not consider them as lunar phenomena.—Lord WROTTESLEY observed, in confirmation of what had fallen from Sir D. Brewster, that when, a few years since, the attention of astronomers was called to the observing of an occultation of Aldebaran, the accounts which different observers gave of the appearances were most remarkable,—some seeing, while others even near them did not, the projection of the star on the moon's dark limb; while to those who did see it the appearances were very dissimilar.

'On a New Case of Interference of Light,' by the Rev. Prof. POWELL.—The principal experiment evincing this new kind of interference consists in placing a plate of glass or other transparent substance, in a prismatic vessel containing a fluid (as, *e.g.* oil of sassafras or anise with plate or crown glass), so as to intercept the upper or thicker half of the prism: when the spectrum is seen covered with dark bands parallel to the edge of the prism, the number and breadth of which vary greatly with the refractive powers of the plate and medium and with the thickness of the plate. In many combinations the plate must be inserted in the way just described, or towards one end of the spectrum, thus exhibiting an effect analogous to what was termed "polarity" in the experiments, by partial interception, of Sir D. Brewster, as in Fig. 1. But for many combinations no bands are produced by this arrangement. In these cases, however, on placing the plate to intercept the thinner part of the prism, as in Fig. 2, bands will be produced. This remarkable relation, as well as the number and character of the bands, can be all expressed by a formula derived from the simple interference theory: but for some more minute changes observed recourse must be had to the diffraction theory, as in Mr. Airy's investigations (*Phil. Trans.* 1840, 1841). Those investigations have been pursued by Mr. Stokes of Pemb. Coll. Cambridge. When plates of doubly refracting crystal are employed, two sets of bands are seen superimposed even in those of the most feeble doubly refracting power, as quartz, &c. This may perhaps be serviceable to the mineralogist for detecting this property when very weak. In general, the number of bands observed in different cases agrees sufficiently well with calculation; and the method may be applied inversely for finding the refractive indices of one substance, the other being known. There is, also, a close analogy between these bands and those described by the Baron Von Wrede, though produced in a totally different manner. (See Taylor's 'For. Scientific Mem.,' vol. I. pt. iii. p. 487.)

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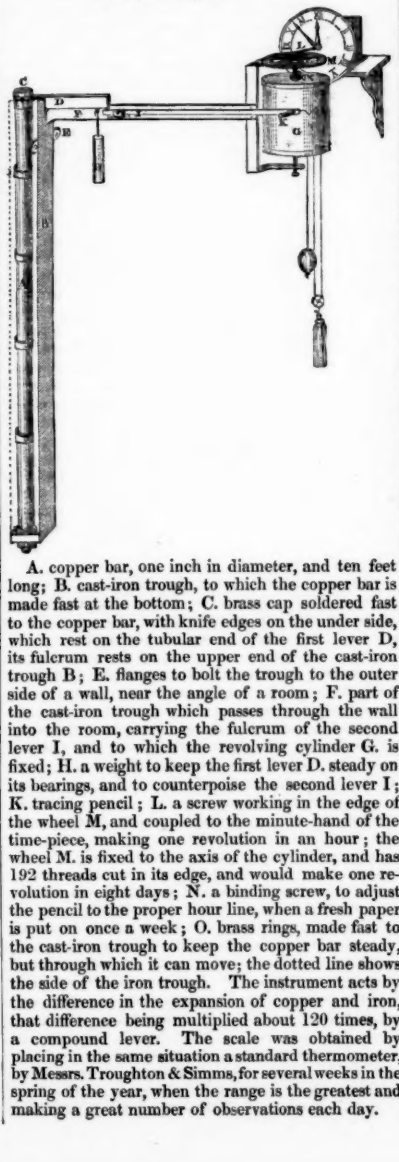
Sir D. BREWSTER pointed out the circumstances under which the bands appeared and did not appear when the refracting angle of the prism was turned to the red or to the blue end of the spectrum, as related to the refractive indices of the prism and the surrounding medium; which in his experiments was oil of cassia.

'On a Self-registering Thermometer, with twelve months' tracings of its work,' by M. HARRISON.—The principle on which the instrument acts, is the difference in the expansion and contraction of two metals, from the effects of heat and cold, and acting by the direct pull of the contracting metal when it is kept in a straight line. It is made sufficiently powerful to overcome any resistance which the fulcrums of the levers or the tracing pencil may cause. I have selected cast-iron and hard-rolled copper as the best suited for the purpose. I find from tables published by Smeaton and others, that copper expands $\frac{1}{510}$ of its length, while cast-iron only expands $\frac{1}{910}$, with a variation of 180 degrees of Fahrenheit's thermometer, which leaves a difference of about the $\frac{1}{1365}$ of its length; and as the range of the thermometer in the shade in this climate is about 90 degrees, or half of 180, I have the $\frac{1}{2730}$ part of the length of the copper bar employed as a moving power. I fixed upon a bar ten feet long as being a convenient length; the two metals will then vary nearly the one-and-twentieth part of an inch between the hottest day in summer and the coldest day in winter. This variation I multiply by means of a compound lever, so as to get a sufficient scale to divide. The end of the last lever carries a pencil which traces upon a revolving cylinder the variations that take place. In order to divide the scale accurately, I procured a standard thermometer by Messrs. Troughton & Simms. I placed it in the same situation, and made several observations in the day, for some weeks, in the spring of the year, when the range of the thermometer is the greatest. After I had got the scale properly divided, I engraved it on a plate of copper, in order to get a number of copies printed. The only attendance the instrument now requires, is to put a fresh paper upon the cylinder, by means of stretching screws fixed on one side of the cylinder, once a week, when I wind the time-piece up.

Self-registering Thermometer.



A. copper bar, one inch in diameter, and ten feet long; B. cast-iron trough, to which the copper bar is made fast at the bottom; C. brass cap soldered fast to the copper bar, with knife edges on the under side, which rest on the tubular end of the first lever D, its fulcrum rests on the upper end of the cast-iron trough B; E. flanges to bolt the trough to the outer side of a wall, near the angle of a room; F. part of the cast-iron trough which passes through the wall into the room, carrying the fulcrum of the second lever I, and to which the revolving cylinder G. is fixed; H. a weight to keep the first lever D. steady on its bearings, and to counterpoise the second lever I; K. tracing pencil; L. a screw working in the edge of the wheel M, and coupled to the minute-hand of the time-piece, making one revolution in an hour; the wheel M. is fixed to the axis of the cylinder, and has 192 threads cut in its edge, and would make one revolution in eight days; N. a binding screw, to adjust the pencil to the proper hour line, when a fresh paper is put on once a week; O. brass rings, made fast to the cast-iron trough to keep the copper bar steady, but through which it can move; the dotted line shows the side of the iron trough. The instrument acts by the difference in the expansion of copper and iron, that difference being multiplied about 120 times, by a compound lever. The scale was obtained by placing in the same situation a standard thermometer, by Messrs. Troughton & Simms, for several weeks in the spring of the year, when the range is the greatest and making a great number of observations each day.

Tabulated results for the year 1847, *taken from tracings by the Instrument described.*

General mean of whole year	47·89
,, of January	36·61
,, of April	44·13
,, of July	61·90
,, of October	49·35
Highest single observation, 1st August ..	80·0
Lowest single observation, 13th February ..	22·0

Prof. LLOYD observed, that he much feared, as the indications of this thermometer were derived from the unequal expansion of different metals magnified by a system of levers, that the bearings of the levers would be found not to move continuously, but by starts.—Sir W. S. HARRIS thought it likely some correction would be required for the hygrometrical state of the paper on which the curves were traced, as well as for the effects of changes of temperature of other parts of the instrument.

Prof. LLOYD having been requested by several members to describe a barometer on a new principle which he had lately seen, said that it was a French invention. A cylinder of copper, with a very thin and corrugated end, was partially exhausted and hermetically sealed; and the effect of the varying pressure of the atmosphere on the thin end was magnified by a system of levers, so as to affect the index of a dial very little larger than a watch-dial. A friend of his had tested the indications of the instrument by placing it under the receiver of an air-pump, and observing its march in comparison with the indications of the long gauge, and found them to agree to less than the 1-100th of an inch.—Mr. JENKINS mentioned some remarkable cases of the discrepancy of the indications of a number of compared thermometers, ranged along a wall at short distances, and at intervals of a quarter of an hour.

'On a Remarkable Tide in the British Channel, July 7, 1848, as it appeared at Lyme Regis, Dorset,' by G. ROBERTS, Esq.—Weather warm and calm. Dead neap tides. Fine for twenty-four hours before the phenomenon. About two hours and a half before the phenomenon, at 1½ a.m. it blew hard for ten minutes. The wind before and after this gust was gentle and had gone round to all points of the compass. At dead low water, or perhaps just after the water had begun to flow at 4 a.m., the tide began to run into the cobb so that a boat rowed with two oars could not make head against it, but was carried along with it. My informant estimates the height of the water to have been about six or seven feet, and that it took eight minutes to flow in or at most ten minutes, and the same time to flow out. Then when out, it began to flow in again,—and so continued till 8 o'clock, a space of four hours, when the sea was quite calm, and so continued all the day. The same was experienced at Dartmouth and Portland. Some of the sailors said it was a Bore; others, that it was caused by thunder weather; some said there had been an earthquake in the ocean. Some sailors say the tide ran ten knots an hour.

'On the Recurrence of the November Atmospheric Waves at Huggate from 1840 to 1848.'—The reading of Mr. BIRT's Report on Atmospheric Waves in the Report of the Association for 1846 induced the author to compare the tables in that report with his own meteorological memoranda. He found, in many instances, the rise and fall of the barometer to synchronize with those tables. The village of Huggate is situated about 53° 50′ 55″ north lat., and about 1′ 40″ east long., and about 700 feet above the level of the sea. This, of course, keeps the barometer lower than that of many of Mr. Birt's stations—which are lower, and have greater atmospheric pressure. Allowance must also be made for the various atmospheric changes on the same day in this insular situation: and these changes, though adjacent, frequently of an opposite nature. The transits of the anterior trough, apex, and posterior trough are arranged according to Mr. Birt's plan.—

1840.

Transit of anterior trough	Nov. 14
Transit of apex	,, 27
Transit of posterior trough	,, 30

Amplitude in time, sixteen days.

1841.

Transit of anterior trough	Nov. 8
Transit of apex	,, 10
Transit of posterior trough	,, 22

Amplitude in time, fourteen days.

1842.

Transit of anterior trough.....	Nov. 12
Transit of apex.....	,, 18
Transit of posterior trough	,, 26

Amplitude in time, fourteen days.

1843.

Transit of anterior trough.....	Nov. 6
Transit of apex.....	,, 15
Transit of posterior trough	,, 22

Amplitude in time, sixteen days.

1844.

Transit of anterior trough.....	Nov. 9
Transit of apex.....	,, 22
Transit of posterior trough	,, 28

Amplitude in time, nineteen days.

1845.

Transit of anterior trough	Nov. 20
Transit of apex.....	,, 25
Transit of posterior trough	,, 29

Amplitude in time, nine days.

1846.

Transit of anterior trough.....	Nov. 4
Transit of apex.....	,, 13
Transit of posterior trough	,, 26

Amplitude in time, twenty-two days.

1847.

Transit of anterior trough.....	Nov. 8
Transit of apex.....	,, 19
Transit of posterior trough	,, 29

Amplitude in time, twenty-one days.

The average time of the wave passing for these eight years was 16¼ days. The extremes were 9 in 1845 and 22 in 1847. $9 + 22 = 31 \div 2 = 15\frac{1}{2}$ medium. On November 18, 1842, when the crest or apex was passing Huggate, the barometer was 30·07; when passing London on the same day it was 30·53 there. The motion from S.E. to N.W. At Christiania it was 30·11 on the same day. At St. Petersburgh, 29·85.—

Motions of the Waves.

In 1840 from N.W. to S.E.
,, 1841 ,, W. to N.E.
,, 1842 ,, S.W. to N.W.
,, 1843 ,, S.W. to W.
,, 1844 ,, E. to S.W.
,, 1845 ,, S.W. to W.
,, 1846 ,, S.W. to W.
,, 1847 ,, W. to S.W.

N.B. The crests in 1846 and 1847 were flat.

FRIDAY.

The 'Report on Atmospheric Waves,' by Mr. Birt consists of three parts:—the first having reference to the information we at present possess relative to such individual waves as have been determined: the second treating of the barometric curves which result from the crossing of the north-westerly and south-westerly waves, the two principal systems common to Europe—the most prominent subject being that particular curve known as the "great symmetrical wave of November": and the third embodying the results that have been obtained during the last year illustrative of the symmetry of the "great wave," more particularly the locality of greatest symmetry and the departure from symmetry in certain directions. Under the second head, the author has thrown together the result of his inquiries into the *forms* presented by the barometric curves at certain stations, and has devoted attention to the symmetrical curve of November as it has been observed at the Observatory at Greenwich in the years 1841 to 1845. In connexion with this subject, the author remarked "it has been assumed that the symmetrical wave of November consists of *five* subordinate waves giving rise to the five maxima which characterize it, the central maximum forming the apex of the symmetrical curve, the remainder being subordinate thereto. ('Association Reports,' 1846, p. 125.) Upon a close inspection of the curves of the 'great wave' as laid down from the Greenwich observations, six subordinate maxima can be traced, three on each side the central apex, which in all the years is by far the most prominent. The mean curve leads to the conclusion that *Greenwich is not the point of greatest symmetry*, its closing portion being depressed more than two inches below the commencement. The next feature is the decided rise of the mercurial column during a period of sixty-eight hours preceding the transit of the crest: the value of this rise is ·7 inch or about ·010 inch per hour. The fall is not so precipitous; the barometer appears to be *kept up* in this locality by the *first subordinate maximum* succeeding the crest, so that at the epoch of sixty-eight hours after transit the value of the reading is more than 2 inches higher than at sixty-eight hours before transit. At eighty hours after transit a precipitous fall commences, which continues during the next twenty-four hours, the mercury sinking ·36 inch or about ·015 per hour. The fall afterwards continues with two slight interruptions, answering to the subordinate maxima, until the close of the wave 148 hours after transit." The peculiar features of the mean curve, especially the difference between the initial and terminal readings, ·241 inch, combined with certain features exhibited by the "great wave" at its last return, has suggested the possibility of expressing numerically the departure from symmetry for any station that may be selected. This departure from symmetry is strikingly manifested by the observations of 1846, especially as we proceed from Brussels, the European nodal point, towards Ireland and the north-west of Scotland, and is well seen in the series of curves illustrating the author's report in the last volume of the Association Reports. Three principal maxima characterize these curves on the 5th, the 9th and the 12th of November; and the differences of altitude between those of the 5th and 12th have been employed to indicate the deviation from symmetry in the direction already alluded to. The discussion of these differences and the results deduced from them form the third part of the report. The author has laid down on a map of the British Isles these differences, and from them constructed a chart of the lines of equal deviation from symmetry: these lines range from ·100 inch—which passes north-west of the Channel Islands, proceeds towards the Isle of Wight, skirts the shores of Sussex and Kent, and passes through Ramsgate—to ·550 inch, which passes through Limerick, is slightly curved as it crosses Ireland, and proceeds nearly in a straight line across the Scottish Islands to the north-west of Great Britain. The values of these lines express the *depression* of the maximum of the 5th below that of the 12th. Among these lines the author regards the direction of that representing ·260 inch as the best determined. It appears to have passed near and to the west of Helstone, this station exhibiting a deviation of ·258 inch; it then proceeded along the coasts of Cornwall and Devonshire, crossed the Bristol Channel, entered Wales, and continued its course across Glamorganshire towards Brecon, which it left to the north-west as it rather abruptly changed its direction and proceeded towards Gloucester, which it passed through. It appears to have undergone considerable inflexion as it traversed the central parts of England, rising again towards Nottingham which is removed ·025 inch from it to the west: it finally left the shores of England at the south-eastern angle of Yorkshire and entered on the German Ocean. The author solicited attention to a feature which characterizes all these lines, especially the one just traced, viz., the decided inflexion they undergo as they pass over the land. The chart exhibits *two* systems of inflexion, one being peculiar to Ireland and England; the general direction of the lines undergoing a change as the line of greatest symmetry is approached, the inflexion being governed apparently by the masses of land: and the other to Scotland, the inflexion being very decided over the land northward of the Firth of Forth. From the *single* instance discussed by the author, the result appears to be that the symmetry of the barometric curve is departed from in a greater degree at *inland* stations, a greater difference between the points selected being exhibited at such stations than at the sea coast on either side. The report closed with some remarks on the non-persistency of the *direction* of these lines of deviation from symmetry, and on the high probability that they revolve about the nodal point of the two principal systems of atmospheric waves, Brussels.

Col. Sabine said he regretted that Mr. Birt was not present, as he should have wished to know the exact way in which he identified the two great waves—one from the north-west, extending so rapidly over all Europe,—the other, as he understood, from the south-west, with an inferior extent of amplitude, but propagated quicker.

'On the Effect of the Rapid Motion of the Observer on Sound,' by Mr. Scott Russell.—Until the existence of the very high velocities now given to railway trains, no opportunities have existed of observing any phenomena in which the velocity of the observer has been sufficient to affect the character of sounds. The author having had occasion to make observations on railway trains moving at high velocities, has been led to notice some very curious effects in sounds heard at 50 and 60 miles an hour. These effects are not heard by an observer who is stationary. He found that the sound of a whistle on an engine stationary on the line was heard by a passenger in a rapid train to give a different note—in a different key from that in which it was heard by the person standing beside it. The same was true of all sounds. The passenger in rapid motion heard them in a different key, which might be either louder or lower in pitch than the true or stationary sound. The explanation of this was given as follows:—The pitch of a musical sound is determined by the number of vibrations which reach the ear in a second of time—32 vibrations per second of an organ pipe give the note c, and a greater or less number give a more acute sound or one more grave. These vibrations move with a velocity of 1,024 feet per second nearly. If an observer in a railway train move at the rate of 56 miles an hour towards a sounding body he will meet a greater number of undulations in a second of time than if at rest, in the proportion which his velocity bears to the velocity of sound; but if he move away from the sounding body, he will meet a smaller number in that proportion. In the former case he will hear the sound a semi-tone higher, and in the latter a semi-tone lower than the observer at rest. In the case of two trains meeting at this velocity, the one containing the sounding body and the other the observer, the effect is doubled in amount. Before the trains meet the sound is heard two semi-tones too high, and after they pass two semi-tones too low—being a difference of a major third. There were next explained the various effects which the noises of a train produced on the ears of passengers at high velocities. The reflected sounds of a train, from surfaces like those of bridges across the line, were at ordinary velocities sent back to the ear changed by less than a semi-tone, so as to cause a harsh discord, which was an element of the unpleasant effect on the ear when passing a bridge. In a tunnel, also, the sounds reflected from any irregularities in the front of the train or behind it were discords to the sounds of the train heard directly. He showed, however, that at a speed of 112 miles an hour these sounds might be those of a harmony with each other and become agreeable, for the sounds reflected in opposite directions would have the interval of a major third.

Sir D. Brewster observed, that in his opinion the explanation of the curious effect of rapid motion of the observer on sound was to be sought from physiological causes, and not acoustic; and pointed out what he considered to be analogous phenomena with respect to light—such as the augmentation of light at the boundary of moving shadows, the perfect clearness with which objects could be seen through rapidly moving openings in screens, and the production of colour by screens in motion under certain circumstances.

Sir W. S. Harris conceived that all the effects were to be explained by the undulatory theory of sound in the manner in which they were explained by Mr. Scott Russell.

'On some New Relations of the Diamagnetic Force,' by Prof. Plücker.—Mr. Plücker gave a short account of experiments belonging to a new magnetic action. A crystal with one optical axis being brought between the two poles of a magnet, there will be a repulsive force, going out from each of the poles, and acting upon the optical axis. According to this action, the crystal, if suspended, will take such a position that its optical axis is placed within the equatorial plane. When the crystal has two optical axes, there will be the same action on both; according to which, the line bisecting the acute angle formed by the axis will turn into the equatorial plane. When the crystal is suspended in such a way that it may freely move round any line whatever of the plane, containing both axes, this plane will take the equatorial position. Thus a crystal being neither transparent nor showing any trace of its crystalline structure, we may by means of a magnet find the optical axes. At the same time we get a new proof of the connexion between light and magnetism. When light is passing through a crystal, there are in general two directions, where it is effected in a quite distinct way,—these same directions are acted upon by a magnet.

Prof. FARADAY contrived to convert two raw potatoes into representatives of the poles of an electro-magnet, and by a slice of another, with a quill stuck through it, represented the magnetic or diamagnetic crystal with its optic axes—and thus contrived to convey a distinct idea of the exact results of Prof. Plücker's discoveries of the relations of the optical axes of magnetic and diamagnetic crystals and the changes of distance to the nature and laws of the attractions and repulsions exhibited under the several circumstances detailed.—Sir W. S. HARRIS considered that the laws of magnetic forces in relation to the action of magnets on each other, or a magnet on a mass of common iron, were liable to vary, from the changes which arose in the amount of inductive action of which the attracting bodies were susceptible. He had shown, in a paper in the *Edinburgh and London Philosophical Transactions*, that in electricity and magnetism the amount of inductive disturbance was limited,—so that after a certain time, under given conditions, the disturbance became the greatest possible, and then the law of the force changed; and hence arose all the irregularities which had embarrassed early inquirers into this subject. In fact, the force between a magnet and a simple mass of iron varied in a simple inverse ratio with the force induced in the iron and with the disturbance conjointly. If either of them became constant, the whole force varied with the other. If, therefore, it should happen that as the disturbance in the iron approached a limit the changes were not uniform, then we obtained irregular results. So long, however, as the induced force went on uniformly, we had the total or absolute force in the inverse ratio of the squares of the distances. In the case of two magnets magnetized, or nearly so, the force of attraction between them varied in the inverse ratio of the simple disturbance, because the amount of the induced force had been reached. On this principle it was found that in the repulsive force between two magnets the repulsive action at certain distances became changed into attraction; and it is not an uncommon circumstance to find two magnets attract at one distance and repel at another. These results he thought might be applied in explanation of some of the phenomena now under consideration. The force of magnetic action might vary, whilst the diamagnetic force after all may have been constant.

Dr. LLOYD inquired if Prof. Plücker had tried whether crystals with positive axes exhibited any difference in the laws of diamagnetic action from those which had negative axes?—Prof. FARADAY replied, that Prof. Plücker had minutely investigated this point, and found no diversity of law corresponding to this difference in optical structure.—Sir D. BREWSTER inquired whether Prof. Plücker had investigated the influence which changes of temperature produced in the diamagnetic action of crystals? Some of these changes, he conceived, were of such a nature as to afford an admirable test whether the same circumstances in the corpuscular constitution of the crystal on which their optical characters depended were those which gave rise to their diamagnetic relations or not. For example, in some of the biaxal crystals, as sulphate of lime, when heated, the axes approached, and at length coincided,—the crystal becoming monaxal; and by continuing the heating, they again separated in a plane at right angles to the one in which they before lay. Such a series of changes, he conceived, if examined in relation to the diamagnetic forces, might afford a test whether the curious properties discovered by Prof. Plücker had their origin in the chemical constitution of the bodies, or in that corpuscular structure from which their optical properties originated.—Prof. PLÜCKER replied, that he had not tried the class of experiments pointed out by Sir D. Brewster; but he admitted their importance, and expressed a determination to pursue the inquiry.—Prof. GROVE inquired whether the experiments were tried with the crystals placed in vacuo?—Prof. PLÜCKER replied no; but in every case they were suspended either in air or in water.—Prof. GROVE pointed out the necessity of caution in that case, as it was well known that differences between the diamagnetic actions of suspended bodies and of the surrounding medium would sometimes mask and even reverse the action.—Prof. FARADAY pointed out the precautions which had been taken to avoid this source of error.

'On the Visual Impression upon the Foramen Centrale of the Retina,' by Sir D. BREWSTER.—The author described by diagrams the position of the optic nerve as it enters the eye; which, though covered by the nervous coat of the retina, is entirely devoid of the choroides; and it is well known that if the image of even a bright object, as of a candle, be made to fall on this spot, nothing but an indistinct luminosity can be perceived. Sömmering was the first who observed exactly, at the place where the optic axis reaches the retina, a spot at which while the choroides was there perfect, the retina was entirely absent; yet it was on this spot that the image was formed when vision was most distinct—for it was well known that when we wanted to see things most accurately, the optic axes of both eyes were directed upon it. This spot, therefore, which was called by its discoverer the Foramen Centrale, had at all times occupied much attention; but it was found very difficult to determine its extent, or even its form—chiefly because in the dead human eye it was found to be a mere fold as some maintained, or two folds across as others. The author—having observed that after the eye had been for some time reposed, if it be turned to a uniformly and not too strongly illuminated surface, such as a sheet of white paper held at some distance, a dark round spot was perceived surrounded by the uniform white of the ground,—said, that this spot in some peculiar states of disease was found to be a bright spot surrounded by a dark ground. On considering this spot, he found its place to correspond with that of the foramen centrale; and having accurately measured its angular magnitude, he found it to be about 35′ of a degree; which, assuming the eyeball to be a sphere of about five-tenths of an inch diameter, would give the diameter of the spot about the one-thirtieth of an inch—which he believed was pretty nearly that assigned originally to the foramen centrale by Sömmering.

'On the Vision of Distances as given by Colours,' by Sir D. BREWSTER.—The author briefly enumerated the several opinions maintained by opticians as to the mode in which the eye distinguishes distances; and particularized the facts determined by Mr. Wheatstone by his beautiful contrivance, the stereoscope. But he considered that there was yet another almost neglected source of distinguishing distances: he alluded to the different places at which the images of different colours are formed from the object. The influence of this any person might at once convince himself of by viewing near objects, which were of well contrasted colours, as the outlines of countries on maps where the bounding lines would be found to be sometimes red and sometimes blue for near countries. Now, it would be observed that when closely viewed, these would appear to separate; the plane of the paper for those parts coloured red to approach the eye, while that of those coloured blue receded.

'On a Difficulty in the Theory of Light,' by G. G. STOKES, Esq.

'On the Perfect Blackness of the Centre of Newton's Rings,' by G. G. STOKES, Esq.—The absence of all reflected light at the centre of Newton's rings, when formed between two lenses of the same substance, was explained long ago by Fresnel, by the aid of a law discovered experimentally by M. Arago, that light is reflected in the same proportion at the first and second surfaces of a transparent plate bounded by parallel surfaces. It occurred to the author that this law may be called the *principle of reversion*. By this is meant the general dynamical principle that if in any material system in which the forces depend only on the positions of the particles the velocity of each particle be suddenly reversed, the previous motion will be repeated in the reverse direction. It follows from this principle, that in the case of a series of waves of light incident on the surface of an ordinary medium, and producing a series of reflected and a series of refracted waves,—if the vibrations in the reflected and refracted series be reversed, the incident series will be produced only in a reverse direction. But the reflected and refracted series, when reversed, would each produce a series of reflected and a series of refracted waves; and it follows from the principle of superposition, that of these four series the two which are situate within the medium must neutralize each other, and the two which are situated outside of the medium must together produce the incident series reversed. Two equations are thus obtained, whereby the perfect blackness of the centre of Newton's rings is explained. These equations are those which are written in Airy's Tract, $b = -c$, $cf = 1 - e^2$. The detail of this method will soon appear in the 'Cambridge and Dublin Mathematical Journal.'

'On the Refraction of Light beyond the Critical Angle,' by G. G. STOKES, Esq.—The principal object in this communication was to give an expression, obtained from the undulatory theory of light, for the intensity of the central spot of Newton's rings when the angle of incidence exceeds the critical angle. It has been shown, by those who have treated the subject of reflection and refraction dynamically, that when the angle of incidence exceeds the critical angle the expression for the disturbance in the second medium contains an exponential, involving the co-ordinate perpendicular to the surface, so that the disturbance is insensible at a distance from the surface of a small multiple of the length of a wave. The expressions for this superficial disturbance have not, however, so far as the author is aware, been hitherto applied to the explanation of any phenomenon,—although the existence of the central spot in Newton's rings has been unhesitatingly attributed to this cause by Dr. Lloyd in his Report on Physical Optics. The author has not entered into any particular dynamical theory, but has preferred deducing his results from Fresnel's expressions for the intensity of reflected and refracted polarized light; which, except perhaps in the case of very highly refracting substances, are, at least, a very near approximation to the truth. The method employed does not even render it necessary to enter into the question,—whether the vibrations of plane polarized light are in, or perpendicular to the plane of polarization? When the angle of incidence exceeds the critical angle, Fresnel's expressions become imaginary; and by reasoning similar to that employed by Mr. O'Brien in interpreting those expressions in the case of reflected light, the author has arrived at formulæ for the reflected and refracted vibrations from whence he has obtained the expression for the reflected light. From this expression the author has deduced the following consequences:—1. At the point of contact there is absolute darkness, and on receding from that point the intensity increases; at first very slowly, so that for some distance round the centre the darkness is as to sense perfect; then the intensity increases more rapidly,—and then it very rapidly approaches its limiting value. This agrees with observation.—2. For different colours the same fraction of the incident light is reflected at points for which the radius measured from the point of contact varies as the square root of the length of a wave. Hence, the spot is larger for red light than for violet; but the separation of colours is small. This agrees with observation.—3. When the angle of incidence lies between the critical angle and a certain angle determined by a simple expression, the spot is larger for light polarized in a plane perpendicular to the plane of incidence than for light polarized in the plane of incidence; while between the latter angle and 90° the reverse is the case. This difference of size agrees with observation;—but it is impossible to say at what angle the changes take place.—4. Suppose internally incident light polarized at an azimuth of 45°, or thereabouts, and let the transmitted light be analyzed so as to darken the centre of the spot, then a faint ring of light ought to be seen separating the dark centre from the generally dark field of view. This ring ought to be blueish inside and reddish or brownish outside, and ought to vanish at the angle mentioned above. The author has not tried this experiment.

THURSDAY.

SECTION B.—CHEMICAL SCIENCE, INCLUDING ITS APPLICATION TO AGRICULTURE AND THE ARTS.

President—R. PHILLIPS.

Vice-Presidents—Mr. W. R. GROVE, Dr. FARADAY, Dr. PERCY, J. D. LLEWELYN.

Secretaries—Messrs. T. WILLIAMS, T. H. HENRY, R. HUNT.

Committee—Dr. Daubeny, Col. Yorke, Dr. L. Playfair, Capt. R. Ibbetson, Messrs. W. S. Ward, A. Claudet, Dr. Carpenter, Col. Dundas, Dr. Roget, Messrs. F. Ronalds, J. P. Gassiot, Sir D. Brewster, Prof. Graham, Dr. Pereira, Mr. R. Warington, Prof. Miller, Prof. Solly, Messrs. J. Tennant, W. Francis, Dr. E. Ronalds, Messrs. R. W. Townsend, G. Lowe, P. Squire, J. P. Joule.

'Report on Colouring Matters,' by Dr. E. SCHUNCK.—Having referred to the six substances which were

discovered in the infusion of madder roots, and described in the last report, the author announces the discovery of a seventh. The continued investigation of the subject has led to the conclusion that there is but one colouring matter in madder, *i.e.* the Alizarin; and that the substance which was thought to be a colouring matter, viz. Rubicin, is not so. The seven substances found in the brown precipitate from the madder infusion are Alizarin, Rubicin, Alpha-resin, Beta-resin, Rubian, Pectic Acid and Oxidized Extractive. The examination of the fluid was next made, and found to contain Xanthic acid and madder yellow. It has also been proved that madder contains sugar;—but as the process by which this is separated is somewhat tedious, we must refer chemists to the report itself. It is known that after madder has been employed for dyeing, it still contains colouring matter, and that the article garanceux is manufactured from this. By treating this substance with boiling muriatic acid, it was found to contain lime, magnesia, oxalate of lime, phosphate of lime, alumina, and per-oxide of iron. After these salts were separated, boiling water extracted a large quantity of colouring matter which would dye mordanted cloth quite full, and of the same colour as madder itself, thus showing that it contains alizarin. Alizarin is found to be composed of

Carbon	56·97
Hydrogen	4·19
Oxygen	38·84

—or, in fact, of carbonic acid and water. Alizaric acid is formed by treating alizarin with concentrated per-salts of iron or nitric acid. The salts of this acid are mostly soluble. Alizarate of lime is prepared by neutralizing alizaric acid with carbonate of lime, and evaporating to crystallization. It crystallizes in prisms possessing great brilliancy. Alizarate of baryta, prepared in the same way by means of carbonate of baryta, crystallizes in silky needles. Alizarate of silver, prepared by double decomposition, is soluble in boiling water, from which it crystallizes as the solution cools. Alizarate of lead is insoluble. By subjecting alizaric acid to heat, it is volatilized, and forms a sublimate in the shape of long white needles, to which the name of pyro-alizaric acid is given. By the solution in water, pyro-alizaric acid appears to be again converted into alizaric acid. Rubiacin was found to be C_{31}, H_9. O_{10}, and Rubicic Acid C_{31}, H_9. O_{16}. Alpha and Beta Resin were next examined, as were also the other constituents: and the author then proceeded to examine the part which each material plays in the process of dyeing: from which it is satisfactorily proved that alizarin is the substance producing colour; and the advantages of converting madder into garancin consists in removing the resins and those bodies which are not only useless but injurious, and in separating alizarin from those salts with which it is in the madder root in close combination.

'Report of Progress in the Investigation of the Action of Carbonic Acid on the Growth of Plants allied to those of the Coal Formations,' by Mr. R. Hunt.—This investigation was assigned to the charge of a committee; and two sets of experiments have been established—one by Dr. Daubeny at Oxford, and the other by Mr. Hunt upon Ferns which have been supplied from the Royal Botanic Gardens at Kew. The arrangements are such that two sets of these plants, belonging to the same class, are made to grow under the same circumstances, except that one set is supplied with measured quantities of carbonic acid. Numerous preliminary experiments had to be made, and several sets of plants have been destroyed in the progress of these. No general result can be announced beyond the fact, that the plants, by being gradually inured to the agency of the carbonic acid, can be made to bear a greater quantity than when a large per-centage is given to them at once. The experiments must be continued over a long period before any decided result can be arrived at.

A discussion ensued, in which Dr. Faraday, Prof., Grove, Dr. Lyon Playfair, and others joined. The importance of the investigation was pointed out; but the uncertainty of the results, and the difference between the condition of the plants in nature and when confined in close vessels were particularly insisted on—and the necessity for a more enlarged system of observation was argued. It was also thought advisable, as these experiments were to determine the question of the conditions of vegetation during the carboniferous period, that the influence of carbonic acid upon animal life, particularly on those classes of reptiles which are allied to the great saurians should be observed.

'On a Galvanometer,' by Mr. W. S. Ward.—This was a modified form of an instrument exhibited at Southampton, in which the coil through which the electric current passes was made to move by the repulsion of a permanent magnet. The coil had fixed upon it, and at right angles to the direction of the wires, a small beam to which scales were attached. The weights required in the scales to bring back the deflected beam to its zero point were the measure of the current passing along the wires.

Dr. Faraday, Prof. Grove and Prof. Miller discussed the merits of this arrangement when compared with the ordinary form of galvanometers in which the magnets move in place of the wire.

'On the Motion of the Electric Fluid along Conductors,' by the Rev. T. Exley.—The object of this communication was to propound a theory by which it was thought all the phenomena of electrical action were explained on the notion of one fluid.

Dr. Faraday drew attention to the fact that the mathematical examination of the subject had led to an equal balance in favour of the hypothesis of both one and two fluids—and that another view, equally plausible, denied the existence of either one. It was, therefore, of the utmost importance that we should move carefully in the inquiry, and endeavour to disentangle truth without entertaining any view more favourable to one than to the other of these theories. The whole subject was involved in perplexing mysteries.

FRIDAY.

'On the Action of the Red, Orange and Yellow Rays upon Iodized and Bromo-iodized Silver Plates after they have been affected by Day-light, and other Phenomena of Photography,' by M. Claudet.—It was shown by MM. E. Becquerel and Gaudin, that a photographic image on a Daguerreotype plate might be developed by the action of the light which permeates yellow and red glasses, without the aid of mercurial vapour. M. Claudet has been continuing his researches on this point, and he confirms those results in a very striking manner. Numerous specimens were exhibited, in which it was shown that the powers of the so-called *continuating rays* in developing the image were not much inferior to the mercurial vapour—presenting a positive image like it, but differing from it in the tint by which it is suffused. M. Claudet suspects that this result is owing to the decomposition of the iodide and bromo-iodide of silver by the least refrangible rays—and that the whites are represented by finely-divided silver in the place of mercury. The rate of action when the chemical agency permeates these coloured media is infinitely reduced for these preparations; but still it is evident that some of the photographic principle permeates them—and also, that these rays which correspond in colour with those media have a peculiar scale of action of their own.

'On the Influence of Light in preventing Chemical Action,' by Mr. R. Hunt.—Bearing on the same subject as that brought forward by M. Claudet, although differing inasmuch as one set of experiments were made upon iodized silver plates and the other upon iodized photographic paper, this subject was taken by the Section before any discussion was allowed on the preceding communication. Mr. Hunt having called attention to several experiments in which certain luminous rays had been found to protect photographic agents from chemical change—particularly in the researches of Sir John Herschel,—proceeded to describe his own experimental investigation of this subject. Taking a piece of highly sensitive photographic paper, which would blacken in a few seconds by the light of an argand gas burner, he threw upon it a condensed spectrum which had been previously analyzed by a peculiar yellow medium—and then, by means of a mirror, reflected the strong light of the sun upon the paper. It was, therefore, under the influence of the unaltered reflected radiations—and also of the spectrum, from which the chemical agency had been as nearly as possible separated. The result was, that the paper was blackened over every part except that portion upon which the strong line of spectral light fell, which was protected from change *and preserved as a white band* in the midst of the darkened paper. This experiment was thought by the author strongly confirmatory of the view which he had taken, that actinism, or the chemical principle, and light, so far from being identical, are opposed in action to each other.

Mr. Grove made a few remarks on Dr. Young's analysis of the spectrum.

'On the Advantageous Use made of the Gaseous Escape from the Blast Furnaces of Ystalyfera,' by Mr. J. Palmer Budd.—This communication drew attention to an economical application of the heated gases which are usually allowed to escape from the top of the iron furnaces. It appears that the gases which are evolved from these furnaces escape at a temperature which is about the melting point of brass. In the iron works at Ystalyfera, where the iron is smelted by the use of anthracite coal, advantage has been taken of this in a most ingenious manner. By an arrangement, which is in its character exceedingly simple, but somewhat difficult to describe without a model (Mr. Budd's description was illustrated by a very nicely constructed one), the hot gas is led off into another channel by means of a strong current generated through a chamber and air-way from a point just below the top of the iron furnace. It is conducted, very little heat being lost in the passage, under the boiler of a steam-engine; and it is found to be at a sufficiently high temperature to heat the boiler without the consumption of any fuel whatever. Hence an immense saving is effected. Although only one furnace and one boiler has hitherto been adapted to this purpose, it is found to effect a saving of 350*l.* a-year. We may consequently expect that when the experiment is further extended and more of the furnaces so arranged that this heat may be economized and employed for the numerous useful purposes to which it is applicable in a large establishment, the saving will amount to many thousands annually. This communication is to be printed entire in the Transactions.

'On the Alloys of Tungsten with Copper and other Metals,' by Dr. Percy.—Since the introduction of some processes by which tungsten has been separated from its ores, and from its combinations with tin and other metals in nature, numerous experiments have been made with the hope of employing it usefully. From the peculiar nature of tungsten it has been thought that it would have the property of giving greater hardness to the metals with which it might be alloyed, and also of protecting them from oxidation. It was with this hope that Dr. Percy made an extensive series of experiments,—alloying copper, brass, German silver, and other metallic bodies with tungsten. In no case, however, has the result been of a satisfactory character.

'Notice of Pseudomorphous Crystals from the Volcanic Districts of India,' by Mr. Tennant.—Some specimens of crystalline changes were exhibited in which those of one form had been removed and those of another had taken their place and assumed the original form, although it was not the shape in which the crystal is naturally found.

'Analysis of Wrought Iron produced by Cementation from Cast Iron,' by Prof. Miller.—It is to be noticed that considerable change in the specific gravity occurred in the iron after cementation: it was forged, and then found to have increased in density; the brittle iron had a specific gravity of 7·684, the malleable 7·718. The results of analysis were briefly these:—the quantity both of carbon and silicon are materially diminished by the cementation, though still the proportion of both is materially greater than in good bar iron. It also appears that the portion of carbon which is insoluble in acids is partly the same both before and after the iron has been rendered malleable, the diminution being confined almost to that portion of carbon which was chemically combined with the metal, and which, therefore, would be in a state for propagation through the mass more readily by cementation.

MONDAY.

'On the Laws of Chemical Combination and the Volumes of Gaseous Bodies,' by the Rev. T. Exley.—This communication, which was a purely theoretical one, endeavoured to reduce all the phenomena of chemical combination to a system analogous to that of gravitation. A sphere of force was assumed,

having attracting and repelling powers, and around this other spheres of force were supposed to congregate. Some chemical examples were adduced in support of this view, to which the author appeared to attach importance.

'On some Properties of Alumina,' by R. PHILLIPS, Esq.—It has been observed by Wittstein that the precipitate which is obtained from the per-sulphate or per-chloride of iron, if kept for a great length of time in water, loses almost entirely the property of being soluble in acetic acid. Mr. Phillips had noticed a similar phenomenon with alumina, arising without doubt from the action of the cohesive forces. Whereas the sesquioxide of iron requires one, or probably two years for the production of the effect; alumina undergoes the change partially in a very short time:—the precipitated alumina does not, however, assume a crystalline appearance, stated to be the case with the cohering sesquioxide of iron. If the precipitated alumina is kept for two days moist, and in the solution from which it was precipitated, even sulphuric acid does not immediately dissolve it. A number of experiments were brought forward in proof of this fact. It was also shown that the interposition of magnesia or of carbonic acid prevented the alumina from cohering.

'On the Chemical Composition of Gutta Percha,' by Mr. F. WHISHAW.—This was a brief communication, simply stating that the crude gutta percha as imported contained the pure gutta percha, a brown precipitate and an appreciable quantity of sulphur.

'On the Electromotive Force, Dynamic Effect, and Resistance of various Voltaic Combinations,' by Mr. W. S. WARD.—A series of experimental examinations were given; the object being to determine the force of the galvanic battery and the resistance of the various metals employed in it, and in completing the circuit. A number of tables were given, showing the varying results obtained by galvanometric measurement.

'On the Peculiar Cooling Effects of Hydrogen and its Compounds in Cases of Voltaic Ignition,' by W. R. GROVE, Esq.—This communication was illustrated by an experiment, in which it was shown that a platina wire, rendered incandescent by a voltaic current, was cooled far below the point of incandescence when immersed in an atmosphere of hydrogen gas. This remarkable cooling property of hydrogen, of course, became the subject of experimental examination in comparison with other gaseous media. By a very ingenious arrangement, tubes containing coils of platina wire were filled with hydrogen and other gases, and then being plunged into water in which delicate thermometers were placed, the wires were traversed by the same current from the battery, and it was found that the water was always more heated in a given time by the wire in the tubes of oxygen, nitrogen, carbonic acid, carburetted hydrogen, &c., than by that in the tube containing pure hydrogen. It became necessary now to ascertain the cause of this peculiar phenomenon of hydrogen. It was found not to be due to specific heat, nor to the conducting powers of the gases. Convection did not explain the fact; and considerable difficulty was found upon examination to exist if it was attempted to refer it to the greater mobility of the particles of hydrogen gas, the lightest known, than of either oxygen, nitrogen, or carbonic acid. It was found that this peculiar property also belonged, but to a less extent, to all the compounds of hydrogen and carbon.

A discussion followed, in which Dr. Williams, Col. York, Prof. Graham, and Mr. Hunt joined.—Prof. GRAHAM mentioned the curious fact observed by him in his researches on the diffusion of gases, that the hydro-carbons move through tubes with great velocity, and that ether vapour, which is four times the density of hydrogen, moves, notwithstanding its weight, at four times the rate of other gases. It was thought this would, perhaps, serve to indicate the path in which an explanation might be looked for.—Mr. HUNT drew attention to the fact, observed by Prof. Graham, that ether vapour had the power of preventing the combustion of phosphuretted hydrogen and of destroying the luminosity of phosphorus, and thought the phenomenon observed by Mr. Grove connected itself in some way with these curious properties of the hydro-carbons.

'On a Peculiar Property of Coke,' by Mr. J. NASMYTH.—The following interesting fact was discovered some years ago, and it appears to furnish additional evidence as to the identity of the diamond with carbon, namely, that *coke* is possessed of one of the most remarkable properties of the diamond, in so far as it has the property of *cutting glass*. I use the term "cutting" with all due consideration—in contradistinction to the property of scratching, which is possessed by all bodies that are harder than glass. The *cut* produced by coke is a perfect clear diamond-like cut, so clean and perfect as to exhibit the most beautiful prismatic colours, owing to the perfection of the incision. Coke hitherto has been considered as a soft substance, doubtless from the ease with which a mass of it can be crushed and pulverized; but it will be found that the minute plate-formed crystals, of which a mass of coke is composed, are *intensely hard*, and as before said are possessed of the remarkable property of *cutting* glass. This discovery of the extreme "diamond-like" hardness of the particles of coke will, no doubt, prove of value in many processes in the arts, as well as interesting in a purely scientific sense.

In a conversation which ensued, it was stated by Mr. Chance, of Birmingham, that in all probability the knowledge of this fact would lead to a saving of nearly 400*l.* a-year in their establishment alone.

'On the Chemical Character of Steel,' by Mr. NASMYTH.—Were we to assume, as our standard of the importance of any investigation, the relation which the subject of it bears to the progress of civilization, there is no one which would reach higher than that which refers to the subject of steel: seeing that it is to our possession of the art of producing that inestimable material that we owe nearly the whole of the arts. I am desirous of contributing a few ideas on the subject, with a view to our arriving at more distinct knowledge as to what (in a chemical sense) steel is, and so lay the true basis for improvement in the process of its manufacture. It may be proper to name that steel is formed by surrounding bars of wrought iron, with charcoal placed in fire-brick troughs, from which air is excluded, and keeping the iron bars and charcoal in contact, and at a full red heat for several days; at the end of which time the iron bars are found to be converted into steel. What is the nature of the change which the iron has undergone we have no certain knowledge; the ordinary explanation is, that the iron has absorbed and combined with a portion of the charcoal or carbon, and has in consequence been converted into a carburet of iron. But it has ever been a mystery that on analysis, so very minute and questionable a portion of carbon is exhibited. It appears that the grand error in the above view of the subject consists in our not duly understanding the nature of the change which carbon undergoes in its combination with iron in the formation of steel. Those who are familiar with the process of the conversion of iron into steel, must have observed the remarkable change in the outward aspect of the bars of iron, after their conversion, namely, that they are covered with blisters. These blisters indicate the evolution of a very elastic gas, which is set free from the carbon in the act of its combination with the iron. I have the strongest reasons to think that these blisters are the result of the decomposition of the carbon; whose metallic base enters into union with the iron, and forms with it, *an alloy*, while the other component element of the carbon is given forth, and so produces in its escape the blisters in question. On this assumption we come to a very interesting question—What is the nature of this gas? In order to examine this, all that is requisite is to fill a wrought-iron retort with a mixture of pure carbon and iron filings, subject it to a long-continued red heat, and receive the evolved gas over mercury. Having obtained the gas in question in this manner, then permit a piece of polished steel to come in contact with this gas, and in all probability we shall then have *reproduced* on the surface of the steel a coat of carbon resulting from the re-union of its two elements, namely, that of the metallic base of the carbon then existing in the steel, with the, as yet, unknown gas; thus synthetically, as well as by analytic process, eliminating the true nature of steel, and that of the elements or components of carbon.

'Report on the Progress of the Investigation on the Influence of Carbonic Acid on the Growth of Ferns,' by Dr. DAUBENY.—Dr. Daubeny reported that the ferns were now growing in a large excess of carbonic acid. Dr. Daubeny suggested some modifications in the form of the experiments, the object being to secure the gas more perfectly than we are now enabled to do.

'On Common Salt as a Poison to Plants,' by W. B. RANDALL.—The following notice is presented as being likely to afford a useful practical caution to those interested in the cultivation of plants. In the month of September last, three or four small plants in pots were shown to the writer, nearly or quite dead; and he was, at the same time, informed that their destruction was a complete mystery to the party to whom they belonged, and that Dr. Lindley had expressed his opinion, from the examination of a portion of one sent to him, that they were poisoned. Having searched in vain for any strong poison in the soil, and in the plants themselves, he inquired more minutely into the circumstances of the case, and found that these were only specimens of many hundreds of plants both in the open air and in greenhouses (but all in pots) which exhibited, in a greater or less degree, the same characteristics. The roots were completely rotten, so as to be easily crumbled between the fingers; the stems, even in young plants, assumed the appearance of old wood; the leaves became brown, first at the point, then round the edge, and afterwards all over; while the whole plant drooped and died. At least 2,000 cuttings in various stages of progress, and 1,000 strong, healthy plants had been reduced to this condition; including different varieties of the fir, cedar, geranium, fuchsia, rose, jasmine, and heath. The sight of this wholesale destruction, coupled with the fact that the whole were daily watered from one particular source, suggested the conclusion that the cause of the evil must reside in the water thus used; and this was accordingly examined. It yielded the following constituents, making in each imperial pint of 20 fluid ounces, nearly 9½ grains of solid matter entirely saline, without any organic admixture:—

Carbonate of lime	0·600
Sulphate of lime	0·462
Chloride of calcium	0·200
Chloride of magnesium	1·252
Chloride of sodium	6·906
	9·420

The mould around the plants and an infusion of the dead stems and leaves also afforded abundant evidence of the presence of much chloride of sodium. Farther inquiry showed that the well from which the water was procured had an accidental communication, by means of a drain, with the sea; and had thus become mixed with the salt water from that source, and had been used in this state for some weeks, probably from two to three months. From about that time the plants had been observed to droop; but it was not until nearly the whole of a valuable stock had been destroyed, that any extraordinary cause of the evil was suspected. To place it beyond doubt that the water was really the cause of the mischief, twelve healthy fuchsias were procured from a distance and divided into two parts; half being watered morning and evening with the water in question, and the others with rain water. In a week, the six plants watered from the well had turned brown, and ultimately died, while all the rest remained perfectly flourishing. Assuming, from these facts, that the common salt in this water was the chief cause of the results described, it is proved that water containing about seven grains of salt in each pint is, in its continued use, an effectual poison to the weaker forms of vegetation; or that when a soil is continually watered with a weak solution of salt it gradually accumulates in it until the soil becomes sufficiently contaminated to be unfit to support vegetable life. In either case an interesting subject of inquiry is suggested—What is the weakest solution of salt which can produce in any measure this poisonous effect?—or, in other words, at what degree of dilution does the danger cease? For salt is an important natural constituent of much spring water, quite independent of any infiltration from the sea, as in this instance. Thus:—the water of the artesian well, Trafalgar Square, London, contains in each gallon about 20 grains; that at Combe & Delafield's Brewery 12·7; that at Wolverhampton Railway Station 6; one lately sunk at Southampton, for supplying a private manufactory, 40. May it not be asked, whether the subject of the suitableness of waters in general for the various purposes to which

they are applied—be it in manufactures or for steam-engines, domestic purposes or drinking—is not worthy of a greater share of scientific attention than it has hitherto commanded?

THURSDAY.

SECTION C.—GEOLOGY AND PHYSICAL GEOGRAPHY.

President—Sir H. T. De la Beche.

Vice-Presidents—Mr. G. B. Greenough, The Dean of Llandaff, The Dean of Westminster, Sir P. Egerton.

Secretaries—Mr. S. Benson, Prof. Oldham, Prof. Ramsay.

Committee—Messrs. L. Horner, R. Hutton, L. W. Dillwyn, Capt. J. B. Ibbetson, Messrs. G. W. Ormerod, W. P. Struve, Prof. E. Forbes, Mr. J. Yates, Lieut.-Col. Portlock, Mr. J. S. Bowerbank, Dr. Carpenter, Messrs. L. L. Dillwyn, R. W. Fox, J. S. Enys, Prof. Owen, Prof. Buckman, Mr. G. G. Francis, Lieut. Spratt, Messrs. W. Sanders, H. E. Strickland, E. W. Binney, Dr. Boke.

'On the Plants of the Insect Limestone of the Lower Lias,' by Prof. Buckman.—The band of limestone at the base of the lias is well known in Gloucestershire and the adjoining counties from its use in fencing barns and kitchens, and to the geologist from having afforded abundance of insect remains resembling those of ordinary occurrence in temperate climates. The plants associated with these insects at Stonesham in Worcestershire, are ferns (*Otopteris*); Calamites; Confervæ; *Naidita lanceolata*, Brodie; Hippuris; and *Equisetum Brodiei*, Buckman. The ferns occur in fragments, and may have floated from some distance; the rest are small aquatic plants, which confirm the opinion that this limestone was deposited in an estuary, and in a temperate climate.

Prof. Ramsay stated that the Palæozoic rocks of Wales had probably formed a coast to the sea of the lias period, and that the Welsh mountains then attained a much greater elevation than at present; so that, as on the Lycian coast at the present day, the insects of the higher and colder regions might be constantly brought down by floods and become imbedded along with the inhabitants of a warmer region.—Mr. Strickland observed that the district over which the insect limestone extended could scarcely have been an "estuary" as there was only evidence of land on one side of it; where the lias abutted against the more ancient rocks of Wales, it often presented the appearance of an ancient shingle beach, and as he had seen remains of marine saurians and the *Ammonites planorbis* in the same bed, he considered it a truly marine formation.—Prof. Buckman replied that as far as he had observed the Ammonites were always found in a layer two yards above the insect-bed.

'On the Discovery of some Remains of the Fossil Sepia in the Lias of Gloucestershire,' by Prof. Buckman.—Remains of the Belemnite and other animals allied to the recent Cuttlefish abound in the lias formation; but the chambered portion of the Belemnite is seldom present, and the ink-bag of the Sepia is still more rare. One specimen discovered by Mr. Buckman is rather more than half the shell or "bone" of a Sepia, nine inches long and six inches wide; in the centre of the specimen is preserved the ink-bag, which consists of about six drachms of a jet black, hard, and splintery substance, easily ground down, and capable of being used as sepia or Indian ink. Another specimen is four inches long by two inches wide, and is marked by three raised lines, which meet in a point at the base. The ink-bag is seen in the centre of this specimen also. They were obtained from a bed of fissile marl, about four inches thick, in the upper lias, near Cheltenham, along with plants, insects, Ammonites, and four species of fish, besides the uncinated arms of another cuttle-fish.

'On the Position of the Chloritic Marl, or Phosphate of Lime Bed in the Isle of Wight,' by Capt. Ibbetson.—The upper greensand stratum, which has received so much attention lately from the discovery (by Mr. Payne of Farnham) that it contained abundance of phosphate of lime, is extensively developed in the Isle of Wight. The phosphate bed is the uppermost portion of the greensand, immediately under the chalk marl, and is a grey marl full of green particles of silicate of iron and of quartzose sand. In its upper part the fossils occur in a bouldered state; but in the lower there is abundance of Ammonites (*A. splendens* and *varians*) and Scaphites in good condition, mixed with coprolitic masses rich in phosphate of lime. This bed occurs along the whole outcrop of the upper greensand, on the southern slope of the chalk range which extends from Compton Bay to Culver Cliff, through the centre of the island, and occupies in some parishes a considerable breadth of surface: it also occurs in belts surrounding the masses of chalk at St. Katharine's Down and adjoining. Much of the intervening country consists of arid ferruginous sands, upon which the phosphate beds might be employed with great advantage. Capt. Ibbetson alluded to the tradition that some portion of the high ground near St. Katharine's Down had subsided considerably even during the last half-century, and he attributed this subsidence to the shrinking of the gault and fuller's earth beds of the lower greensand, which are continually wasted by the percolation of water.

Prof. E. Forbes stated that amongst the fossils collected by Capt. Ibbetson in the upper greensand was one of great interest in a natural history point of view, as confirming an opinion which he had expressed some time ago respecting the distribution of animals in *time*. It was his belief that whenever species of a particular generic group were present in strata of one epoch, and again at another subsequent epoch, but not in the intervening period, the progress of research would bring to light other species which would make the whole form one continuous series, and thus strengthen his conviction that the existence of *genera* was not an empirical notion, but one founded on affinities and distinctions really existing in nature. In the present instance, the species belonged to the genus *Neara*, which had been previously known in the oolitic strata, and also in the tertiary deposits, and in the present seas; the oolitic and tertiary species were now connected by the discovery of a cretaceous species.—Prof. J. Phillips expressed his concurrence in Mr. Forbes's view, that there was no instance of a generic group becoming extinct, and being re-introduced; each appeared to have had its commencement, climax, and end. Some groups which commenced very early in geological history had already ceased, owing to the changes in the physical condition of the globe; others still remained, because the conditions under which it was possible for them to exist had never been removed.—Mr. Strickland confirmed Capt. Ibbetson's statement respecting the subsidence of high ground at the back of the Isle of Wight; and inquired whether the circumstance might be connected with the dislocation of the strata, and the slight but still prevalent earthquakes experienced at Chichester.—Capt. Ibbetson replied that the strata in this part of the island were so horizontal that he could only attribute the subsidence to the wasting by water of the subjacent strata.

'On the Polarity of the Cleavage Planes, their Conducting Power, and their Influence on Metalliferous Deposits,' by Mr. E. Hopkins.

'On the great Anticlinal from Newbridge, in the Taff Valley, to Cefn Bryn, in Gower,' by W. P. Struve.

FRIDAY.

'On the Geology of Portions of South Wales, Gloucestershire, and Somersetshire,' by Sir H. T. De la Beche.—The rocks of this district have originated in several distinct ways: some have had a mechanical origin, and consist of the detritus of older rocks broken into fragments or reduced to powder, and brought down from the land by rivers, or worn by the breakers from the coast; others have been deposited from a state of chemical solution, like some of the limestones; and some have been formed almost entirely from the aggregation of organic remains. The materials obtained from the destruction of the older rocks have been employed over and over again in the formation of those of later date. 1. The most ancient strata of the district have been denominated Cambrian and Silurian; the former may be seen in Pembrokeshire, towards St. David's. They contain the earliest fossil remains which have been discovered. Numerous volcanoes appear to have been active at this period, ejecting quantities of ashes which, falling into the sea, entombed the animals living on its bed. Even at this early period there may be discovered indications of part of the sea's bed having been upheaved so as to form dry land or islands. Subsequently a depression took place, and an accumulation of sand was spread over the whole, constituting what is called the Caradoc Sandstone. After many thousands of feet of materials had thus been accumulated and become consolidated, another contortion and folding of the strata took place, followed by a change in the nature of the materials deposited in the sea. 2. The second series of deposits constitute the Old Red Sandstone, which consists mostly of detrital matter, but contains occasional beds of impure limestone (*cornstone*), and in its lower part there is a great thickness of marl, also coloured red by per-oxide of iron, and occasionally streaked with blue and green where the iron has been reduced to a lower state of oxidation by the presence of decomposing vegetable matter. The upper beds consist of coarse sand and gravel cemented together and forming a hard conglomerate; the multitude of quartz pebbles, derived from *veins*, indicates an immense destruction of older rocks. No fossils are found in this formation, because sands are always barren, and per-oxide of iron is fatal to animal life when it exists in excess; but in the *cornstones* a few remarkable fishes (*Cephalaspis*, &c.) have been obtained. These rocks appear to have been formed near a coast, whilst at a small distance in Cornwall and Devon the sea was depositing fine sediment, was free from the injurious per-oxide, and abounded in organic life. The Old Red Sandstone is sometimes conformable to the underlying Silurian rocks,—at others unconformable; and in the Valley of the Towy it begins to overlap the Upper Silurian and rest upon the Lower Silurian rocks; further west, it is itself overlapped by the coal-measures which there rest on the Silurians. 3. After this another great change took place, and the sea deposited carbonate of lime, forming the carboniferous limestone, well shown on the coast of Pembrokeshire. The lower part of this series consists of sandstones and shale, in which the remains of fishes occur in abundance. Mollusca also appear; and soon the abundance of organic remains becomes so great that whole strata are formed of their remains: indeed, the carbonate of lime seems to have been chiefly procured by the agency of animal life. This limestone which is sometimes 2,000 feet thick, dwindles to 70 or 80 feet towards Haverfordwest, and does not appear to have extended far to the north. Here a change of mineral character takes place in the coal-measures, originally consisting of mud, sand, gravel, and accumulations of vegetable matter. The lowest division, millstone grit or farewell rock, is usually a white quartzose sand, but sometimes a calcareous mudstone with organic remains, the equivalent of the culm of Devon. Above this were formed beds of mud and sand, with occasional beds of vegetable matter and carbonate of iron; these beds diminish in thickness from Merthyr Tydvil to Pont-y-pool; and are wanting in Dean Forest, but exist in the Bristol field. With respect to the origin of the coal in this district, there is evidence that it originated in accumulations of vegetable matter which *grew on the spot*. The conditions under which the beds of coal occur have been described minutely by Mr. Logan; under each coal seam is a bed of sandy clay, full of the fossil plants known as *Stigmariæ*, and which Mr. Binney has shown to be the roots of another plant, the *Sigillaria*, equally abundant in the coal, which must have grown in swamps near the sea. After each great accumulation of vegetable matter, the land seems to have subsided, and the sea flowed in, bringing sand and mud and marine shells; again marshes were formed and fresh accumulation of peat and plants, to be in turn covered by silt from the sea. Evidence of the local origin of the coal is also afforded by the frequent occurrence of fossil trees with their trunks erect and their roots spreading out in the clay below; several of these trees, each 14 or 15 feet high, were discovered at the head of the Taw Valley, the outside of their trunks appears to have been originally hard and to have resisted the action of water for some time, but their interior was soft and soon became hollow and filled with mud, which is regularly stratified; the sandstone on the outside of the trees also bears traces of the rippling of the water around them. The iron ore of the district occurs in the form of nodules of argillaceous ironstone, lying in courses; the cracks in these nodules being filled with carbonate of iron just as those in the cement-stones (*septaria*) of the lias are filled with carbonate of lime. Sometimes the iron ore is mixed with more or less carbonaceous matter, and is called black band. One of the remarkable phenomena of the coal district is the occurrence of cracks, attended with the displacement of the beds on either side; these *faults* are numerous, and amount in one

instance to 2,400 feet; the cracks are sometimes wide, whilst at others the sides are in close contact. Many of the faults appear to have been formed before the deposit of the magnesian conglomerate; but others appear to have been formed at almost every subsequent period. In some instances beds of coal seem to have been partially washed away before the accumulation of the succeeding bed, giving rise to spurious faults, such as that called the "Horse" in the Forest of Dean. 4. At the conclusion of the coal period, all the existing rocks appear to have been squeezed and contorted not only in Britain, but over a great part of Europe, a new deposit of detrital matter began to be formed, similar to those before the coal period, and called by way of distinction the *New* Red Sandstone. Where this formation approaches the older rocks it puts on the appearance of a shingle bed, in which the detritus of the older rocks is cemented together by carbonate of lime and magnesia, hence termed the magnesian conglomerate. These fossil beaches are thickest on the south-west and west flanks of the Mendip and other hills, indicating an open ocean and prevalent winds in that direction. In the red sandstone and marls formed at the same time, but further from the coast, there are no traces of animal life; but as the red stain disappears from the rocks, towards the conclusion of the period, remains of fishes and shells appear. 5. Further subsidences took place; the sea, now freed from the per-oxide of iron, swarmed with animals of extraordinary form and structure. We still trace its boundaries in Glamorganshire and the Mendips by beds of rolled pebbles from the subjacent rocks, and close to these sheltering coasts the remains of marine saurians abound in the consolidated mud and limestone (*Lias*), along with the bones of the flying *Pterodactyle*. Somewhat later, great beds of oolitic limestone were accumulated in the sea, which now constitute the Cotteswold Hills and their extension to Bath and Dorsetshire. 6. No further history is afforded by this district until comparatively modern times, when we find evidence of subsidence beneath the sea and of agencies by which the present form of the surface was accomplished. The present land must have been at least 1,500 feet lower; and, therefore, nearly all under the sea. There is also evidence that the climate became cold, that there were glaciers in the mountains of North Wales and icebergs floating round the shores, carrying blocks of stone and gravel and presenting all the phenomena of Polar regions. The sea also accumulated beds of clay, in which the few existing shells are of Arctic character. Still later the land must have risen again above the sea to an elevation greater than it now has; for we find *sub-marine forests* fringing all the shores of Europe from Spain to Norway. Of this one of the best examples occurs in Swansea Bay, where the stumps of oak and alder may be seen at low water, 20 or 30 feet lower than they could have grown.

'On the Relative Position of the various Qualities of Coal in the South Wales Coal-field,' by S. Benson, Esq.—The coal is of three kinds: 1. bituminous, the small of which will coke; 2. free-burning, the small of which will not coke, but which burns with great rapidity and a considerable volume of flame; 3. anthracite or stone coal. These three pass into one another imperceptibly; the same vein of coal changing gradually from bituminous to free-burning, and from this to anthracite. 1. The coal beds which crop out on the south side of the basin are highly bituminous, becoming less so towards the north. The five-foot vein, extensively worked near Swansea on the south rise, is highly bituminous,—on the north rise, within a distance of two miles, it becomes free burning. The various beds also differ considerably in their bituminous qualities and commercial value. 2. The free-burning coals occupy a tract running north-east and south-west through the centre of the coal-field. Those which are intermediate between the free-burning and bituminous are perhaps better adapted than any for smelting purposes,—and in the neighbourhood of Merthyr form the chief supply for the blast furnaces, being either used raw or the large only being coked in the open air. The pure free-burning coals are less adapted for smelting, but are preferred for steamers from their readiness of combustion and the absence of clinkers in the grate. Free-burning coals are admitted to government contracts from the following places: Llangennech, Camerons, Graigola, Brindowey, Resolven, and Aberdare. 3. The northern side of the basin is occupied by the anthracite, which graduates through the various "culms" into the free-burning coal. In Pembrokeshire the coal is all anthracitic. Taking the area of the Glamorganshire coal-field at 750 square miles, it is estimated that $\frac{11}{15}$ of this area is occupied by bituminous and free-burning coals, and the remainder by culm and anthracite. It appears that the beds of coal on the south crop lose their bituminous qualities gradually as they dip to the north; so that if on a section lines are drawn to show the boundaries of the qualities of coal they will not be vertical but inclined to the north. If the change in the quality of the coal is attributed to the influence of subterranean heat, then the inclination of these lines will serve to point out the direction from which that heat acted, namely, from the north-west of the coal-field.

'On a Boulder of Cannel Coal found in a vein of common Bituminous Coal,' by S. Benson, Esq.

Mr. Booker, being called on by the President for some statistical information, stated that there were 159 blast furnaces in the district employed in smelting iron, and that 550,000 tons of iron were annually manufactured. The coal raised in the district was employed as follows.—

1,500,000	tons	annually in the manufacture of iron.
200,000	,,	,, ,, ,, copper.
150,000	,,	,, ,, ,, tin.
750,000	,,	employed in domestic purposes and in agriculture.
1,750,000	,,	exported.
4,350,000	tons per annum.	

At this rate, and supposing the coal to exist only over 100 square miles, there was sufficient for 1,400 years to come. The value of the exports from the district, consisting of iron, &c., in a state of rough manufacture, amounted to 4,000,000*l.* a-year.

'On Fossil Remains recently discovered in Bacon Hole, Gower; also some from beneath the Bed of the River Tawe,' by C. S. Bate, Esq.—Bacon Hole is a fissure in the limestone rock on the sea-coast west of the headland of Poldy, and about nine miles from Swansea; it is about twenty feet above high-water mark, and narrows rapidly from the entrance to the extremity, where it divides into two fissures: it is 30 feet wide in the centre of the main chamber and 128 feet long. The sea appears to have already removed part of it, as the shore below is strewn with masses of breccia and stalagmite. The floor is highest at the entrance and inclines gradually inwards; the roof of the cave at the highest point does not exceed twelve feet, but the two fissures at the end rise to a much greater height. The fissure above the cavern is filled by a deposit of carbonate of lime,—which, however, only forms one stalactite, the "flitch of bacon," from which the cavern takes its name; on the floor the stalagmite is extremely thick and requires to be blown up with gunpowder before the breccia below can be explored. In this have been discovered bones of the deer, ox, cave bear, hyena (?) and bat, and the seed of a plant; the cave does not, however, appear to have been inhabited as a den. Mr. Bate also exhibited antlers of the red deer from the clay about six feet below the bed of the River Tawe, discovered in digging the foundation for a bridge and other works.

The Dean of Westminster remarked that the entrance of the cave of Paviland and others on this coast had been washed away by the sea.

MONDAY.

'On the Drainage of a Portion of Chat Moss,' by G. W. Ormerod.—The *surface* of the moss varies from 80 ft. to 100 ft. above the sea level; its *bottom* at the deepest part is 100 ft. below the sea line. Part of this moss is now being laid dry by means of open drains, under the directions of Mr. Ormerod. After cutting the drains the level of the peat falls rapidly; near the main leader it sank perpendicularly 5 ft. 6 in. in nine months, and in one part 2 ft. 6 in. in a single week.

The Dean of Westminster inquired whether, after the peat had been burnt, a fertile soil could be obtained without the addition of lime and other materials, which usually cost as much as 20*l.* per acre. In the borders of the Irish bogs many tracts had been reclaimed by small occupants, who worked upon them, and exercised a proper economy with regard to manures. But if large tracts of bog had to be reclaimed by landowners who had to pay for everything, it became a question of cost which had not been answered.—Mr. Ormerod replied that a considerable amount had been reclaimed on the borders of Chat Moss, and that the occupants were so well satisfied with the experiment that they were going on with it. It was usual, after taking the water off, to delve it and apply town manure mixed with marl from the borders of the morass.

'On the Submergence of Ancient Land in Wales; the Accumulation of newer Strata around and above it; and the Re-appearance of the same Land by Elevation and Denudation,' by Prof. A. C. Ramsay.—This communication was illustrated by a section, on a true scale, of the rocks near Builth, in Radnorshire, where the Wenlock shales rest unconformably on the Llandeilo flags. The lower rocks must have been elevated previously to the formation of the upper, and their upturned edges must have been worn away by the sea when the upper rocks were deposited or previously. No power is known to exist far below the level of the sea, by which this process could have been effected; it must have taken place at the sea's level. Throughout Wales the Lower Silurian rocks appear to have been disturbed at one particular period, to have been heaved above water and formed a coast, around which the succeeding rocks were accumulated. Near Bishop's Castle the upheaval of the Llandeilo flags was followed by the deposition of the Caradoc sandstone, which is full of pebbles of the older rocks. After this a subsidence appears to have taken place, the area of the sea was increased, and the Wenlock shale was deposited not only over the Caradoc sandstone, but beyond it, as at Builth, upon the Llandeilo flags; and in some places the shale rests on Greenstone rocks and certain pebbles from it, being in fact a gravelly sea bottom. This depression of the bed of the sea continued also during the deposition of the Ludlow rocks, which are conformable to the Wenlock shale; and there is no marked alteration in the organic remains of the two rocks. The Wenlock shale is 1,500 feet thick, and the Ludlow rocks 3,500 feet; and as it is certain that their organic remains could not have existed at the depth of 5,000 feet, we must suppose a gradual subsidence of the area, such as is believed to be now taking place amongst some of the coral islands, until 5,000 feet of rocks was accumulated over what had been dry land. The old red sandstone, which has a maximum thickness of 8,000 feet, appears also to have extended over this country, judging by the outliers, at a considerable distance to the north and west. Subsequently, the whole of this series, from the Caradoc sandstone upwards, was removed, and the ancient Silurian strata became the surface of dry land as they had been so long before. It now became a question, what amount of alteration may the Silurian rocks have undergone during the time they were so covered up? If the same laws regulated the ascent of the internal temperature as at present, namely, 1° for every 54 feet, then the addition of 5,000 feet of rock would have raised the temperature by 92°, whilst 9,000 feet would have added 160°, and with 11,000 of superincumbent strata the Lower Silurian rocks must have endured an increased temperature of 212°. To influences of this kind may, perhaps, be attributed the crystalline or metamorphic condition of some of the more ancient rocks,—as suggested by Sir J. Herschel, in a paper communicated years ago to the Geological Society of London.

The Dean of Westminster referred to the Portland rock, in which a bed of vegetable soil occurs, full of trunks of trees, and cycadites; this bed rests on limestone containing ammonites, and is covered by similar marine deposits. Again in the Weald, fossil forests, and beds of freshwater shells are found above marine accumulations, and followed by the greensand and chalk. At the present time we find peat, and antlers of the red deer, in the bed of the Channel, several miles off Swansea. On the Norfolk coast, and in the English Channel, are found the bones of the elephant, and fossil wood, disinterred from former cliffs by the action of the sea. These, with many other circumstances, were quoted as showing that whilst the sea-level was fixed, the land had suffered depressions and elevations at many periods of time.—Prof. Phillips pointed out the extent of

some of these subsidences of the land; for example, the old red sandstone, 8,000 feet thick, all formed in shallow water, and the coal measures 11,000 feet thick, and added, under similar circumstances; and inquired what condition of the interior of the Earth can have admitted of the gradual subsidence of such great masses of strata? According to Mr. Hopkins's statement, it was improbable that the interior would now admit of it. With respect to the augmentation of temperature which would follow on the addition of several thousand feet of strata, it should be remembered that the communication of heat from below, through such rocks, was remarkably slow; and the law of the distribution of internal temperature could not be assumed the same in ancient as in modern times. As to the level of the sea remaining unchanged, this was only assumed for security in geological reasoning; there was evidence in the Malverns of a sea-level 600 feet above the present, but it was impossible to say whether that ancient level was nearer the *centre of the earth* when formed than now.

Lieut.-Col. PORTLOCK communicated some observations on apparent changes in the level of the coast near Portsmouth, and contended that, as these evidences of subsidence could be traced back to the most ancient times, so they had continued up to the present day, and expressed his conviction that a parallel might be found in existing nature to all the phenomena of ancient times. It appears that Fort Cumberland, near Portsmouth, stands on a bank of gravel and sand, and that owing to some new wall made to protect it from the sea, a fresh direction was given to the tide, and a portion of the bank undermined and washed away, in the course of which a thick plank with a bolt was discovered, showing that the basis of the fort had no great antiquity. An artesian well has also been made to supply Blockhouse Fort, which shows, for the first 60 ft. nothing but clean shingle, and then a layer of sandy clay, full of common oyster-shells.

Prof. OLDHAM exhibited a section of the hills known as the Chain of Kildare, in Ireland,—a low range, running N.E. and S.W., amidst bogs and flat country. They consist of a great mass of trap, succeeded by alternating slates, sandstones, and trap, calcareous rocks, shales, slates and sandstones,—all forming one conformable and regular series, elevated at an angle of from 45° to 70°. Resting on the edges of these rocks, and filling up the hollows, is the conglomerate of the old red sandstone, succeeded by the carboniferous limestone. On the flanks of the hills, and rising nearly to their summits, is a great deposit of modern drift, attaining a thickness of 200 feet in sheltered places. The section afforded evidence of several periods of elevation above and depression beneath the level of the sea; and it was alleged to be an object with the geologist to map the surface of the land at each period of the earth's history.

Prof. RAMSAY remarked that he had not intended to imply that the level of the sea remained absolutely the same, as every deposit in it must raise its level; but he wished to protest against the doctrine that the ancient sea-beds and beaches, high above the sea, in South America and elsewhere, had attained their altitude through any subsidence of the sea, instead of the elevation of the land.—Mr. GREENOUGH contended that the level of every sea and of the ocean was constantly undergoing changes.—Mr. BESSON alluded to the occurrence of ripple-marked sandstones in the Pennant grits of South Wales, which indicated a subsidence of those beds from near the sea level to a depth, in some places, of 2,000 ft.

'Notice of Discoveries among the British Cystideæ,' made since the last Meeting, by Prof. E. FORBES.

Mr. J. G. JEFFREYS exhibited specimens of the following rare and recent British shells, and species, which he considered identical with them, in the crag formation:—

RECENT.	FOSSIL.
Buccinum ovum. Turt.	*B. Dalei.* Sow.
Fusus scalariformis. Gould.	*Id.* Sow.
Scrinea arctica var? Forbes and Hanley.	*Sphenia cylindrica.* Sow.
Natica helicoides. Johns.	*Id.* Sow.
—— *sordida.* Lam.	*N. cirriformis.* Wood.

'On some Experimental Borings in Search of Coal,' by Prof. J. BUCKMAN.

The DEAN OF WESTMINSTER read a letter, describing a large plesiosaurus, discovered in the Alum Works of Mr. Moberley, at Kettleness, near Whitby: length of the head, 3 ft. 2 in.; neck, 5 ft. 10 in.; back, 7 ft. 1 in.; tail, 6 ft. 10 in.; total, 22 ft. 11 in.; width of anterior paddles, nearly 13 ft.

THURSDAY.

SECTION D.—ZOOLOGY AND BOTANY.

President—Mr. L. W. DILLWYN.

Vice-Presidents—Messrs. L. L. DILLWYN, W. SPENCE, G. BENTHAM, N. WALLICH.

Secretaries—Dr. LANKESTER, Messrs. R. W. FALCONER, A. HENFREY.

Committee—Rev. E. Hill, Dr. Roget, Dr. Carpenter, Mr. J. D. Llewelyn, Dr. T. Williams, Mr. C. C. Babington, Prof. E. Forbes, Messrs. G. H. K. Thwaites, R. Ball, J. S. Bowerbank, R. M'Andrew, R. Taylor, C. E. Broome, M. Moggridge, J. G. Jeffreys, Dr. Burchell, Prof. Owen, Messrs. J. Hogg, H. E. Strickland, L. Reeve, Lieut.-Col. Portlock, Messrs. W. Clear, J. Ball.

The President drew attention to the recently-published volumes of the Ray Society; especially the monograph 'On the British Medusæ,' by Prof. E. Forbes, and the great work of Messrs. Alder & Hancock, on the Nudibranchiate Mollusca. He also recommended to the attention of naturalists the new work by Mr. H. S. Strickland 'On the History and Structure of the Extinct Bird, the Dodo.'

'On the Recent Species of Odostomia, a genus of Gasteropodous Mollusks inhabiting the Seas of Great Britain and Ireland,' illustrated by specimens, by Mr. J. G. JEFFREYS.—The author, after a few preliminary remarks, gave an historical account of the genus; and proposed the coalition of all the species now composing the separate genera of Odostomia, Chemnitzia, and Eulamella in one genus, treating the others as sub-genera; and he founded this view upon his observations of the animals, as well as on the shells, of each of those so-called genera. After describing the characters and habits of these mollusks, he gave a synoptical view of the species, 32 in number. Of these, nine (*viz. notata, alba, dubia, acuta, diaphana, dolioformis, fenestrata, clathrata,* and *formosa*) he described for the first time. The author then proceeded to an elucidation of their synonymy, which was previously in a state of confusion; and the following is the result of his researches. Out of the 32 species enumerated and described by him, 9 were new, and hitherto unpublished; 9 had been described and figured by Philippi as Sicilian shells; 1 by Recluz as French; 10 by Loven as inhabiting the Scandinavian consts; 7 by Searles Wood as crag fossils; and 1 (for which the author proposed to restore the Linnean name of lactea for elegantissima) as indigenous to the Middle and South of Europe.

Prof. E. FORBES stated that naturalists were indebted to Mr. Jeffreys for working out the details of a difficult genus. He, however, objected to applying the generic term Odostomia to the whole of these animals. They constituted, in fact, a group by themselves, which might be divided into three genera—first, the Odostomia proper, in which the shell has rounded apertures and broad tentacula; a second group with ornamented apertures and broad tentacula; and, thirdly, a group with irregular mouths and elongated tentacula. He pointed out some species which were found in the Mediterranean; and observed that the Fauna of that sea was, in fact, but an arm or branch of the Atlantic.

'On a new Species of Argonaut, with some Observations on the *A. gondola*, Dillwyn,' by Mr. LOVELL REEVE.—Among the Argonauts captured by Sir Edward Belcher during the voyage of the Samarang are two species,—one distinct from any hitherto described, the other identical with a species, *A. gondola*, described upwards of thirty years since by the President of the Section, Mr. Dillwyn, in his 'Descriptive Catalogue of Shells,' but which had been disposed of by subsequent writers as a variety or immature state of the *A. hians* or *tuberculosa*. Specimens of each species were taken alive on the Samarang by means of a gauze net at night, and drawings of the animal were exhibited, made by Mr. Adams from the living animal at the time of its capture; and the author had satisfactorily identified Mr. Dillwyn's species by means of these and other specimens in different stages of growth collected by Mr. Cuming in the seas adjacent to the Philippine Islands. The *A. Owenii* is distinguished from any species hitherto described by its laterally compressed form and prominent developement of the wrinkles. The *A. gondola* is chiefly remarkable on account of the wide prolongation of the auricles on either side of the spine, whilst the keel of the shell is unusually wide, with the tubercles distant and more compressed. The lateral wrinkles are much less numerous than in *A. tuberculosa*, to which Mr. Dillwyn's species had been ascribed, and do not fade into solitary warts.

Sir EDWARD BELCHER stated that the animals were taken between St. Helena and the Line, and that they were always caught an hour before daylight.

Dr. LANKESTER read a Report from the Committee appointed for drawing up tables for the registration of periodical phenomena occurring in plants and animals. Proofs of the proposed tables were exhibited; in which arrangement was made for the registration of particular phenomena in animals and plants that had been named by the Committee in a former Report, printed in the Transactions for 1846. Lists of these animals and plants were subjoined. The phenomena to be observed were, the appearance and fall of the leaves, the flowering and ripening of the fruit of plants, and the opening and closing of their flowers; the appearance, disappearance, pairing, moulting, the deposition of eggs, and the birth of young, in animals. Members and others were invited to apply for tables for the purposes of registration; and, when filled up, to send them to the Assistant General Secretary of the Association.

'On the Boring of the Mollusca into Rocks and on the removal of Portions of their Shells,' by Mr. A. HANCOCK.—The author stated that three theories had been advocated as to the way in which the mollusks effect their entrance into the rocks, &c., in which they are found. The first is, that the animal works with the shell in the manner of a rasp or an auger. The second, that it secretes an acid whereby the substance with which it comes in contact is dissolved. The third, that the effect is produced by the vibratile action of the parts exciting constant currents of water against the substance, aided by its impetus when drawn in down the elongated body of the animal. The author objected to all these theories. In opposition to the first, he stated that the burrows are tortuous and of a form to render it impossible that the valves of the shell should act as a centre-bit or auger. Again, the spines which cover many of the shells are covered with an epidermis which, if the shells were used for boring, would be rubbed off—which is not the case. The young of these creatures commence boring directly they are hatched, when their shells are too delicate to produce any effect on the substances into which they penetrate. In opposition to the theory that a solvent is employed, the author stated that this must be of an acid nature, and that by the most careful experiments he had been unable to detect the slightest indications of any acid secretion from any part of the bodies of these animals. Besides, if a solvent were secreted capable of dissolving calcareous and sandstone rocks, ought it not also to act on the shell of the animal?—which was found not to be the case. The physical appearances of the excavation, also, were not like those produced by a solvent. It would not account, either, for their boring in wood. The wood found in the stomach of the *Teredo navalis* was found to be chemically unchanged. The theory of the ciliary currents was objected to on the ground that it was inadequate to explain the phenomena. If these delicate ciliary currents were capable of effecting this object, the dashing of the water over the same surfaces ought to have as much more effect as their physical force is greater. The anatomical structure of the part, also, on which the cilia are situated would forbid the supposition that currents produced by them could effect this object. These theories being insufficient to explain the phenomenon, the author proposed a new one. He believes that the anterior portion of the animal is the excavating instrument. This, in *Teredo* and *Pholas*, is composed of the foot and edges of the mantle, which together fill up the frontal gape of the shell. In *Salicava* and *Gastrochœna* it is formed wholly of the edges of the mantle, which are united and thickened. The form of the excavation corresponds to the form of these organs. On a minute examination of the surface of the foot of *Teredo Norwegica* it is found, under the microscope, to be crowded with minute brilliant points, which on being compressed consist of comparatively large crystalline bodies embedded within them. These crystals are numerous and of various sizes and shapes, chiefly five and six sided,

but not by any means regularly so. They all agree in having one or more elevated points near the centre. These bodies are highly refractive, and are for the most part pretty regularly distributed over the whole convex surface of the foot, but are occasionally congregated into masses. Similar crystalline bodies are embedded in the edges of the mantle surrounding the foot. In *Pholas* the same appearance is presented both in the foot and the surrounding edges of the mantle. *Saxicava rugosa* has also the anterior portion of the animal abundantly provided with crystalline bodies like those already described; so also with the foot and mantle of *Patella vulgata*. These bodies are constantly being shed. Acetic acid has no effect on them; and in *Saxicava* strong nitric acid produces no change after several days' immersion. Those of *Pholas* and *Teredo* appear to be ultimately acted on by this acid, but are never totally destroyed by it. It is by means of these bodies that the author believes the animal rasps down the substances in which they are found. The whole of these animals are also supplied with powerful muscles by which they may effect the necessary movement for the production of this result. Judging from analogy, the author believes that all the boring mollusks excavate in the same manner; none by the rasping or cutting of their valves, none by a solvent, none by ciliary currents. In the same manner he accounts for the gradual disappearance of certain portions of the columella in the gasteropodous Mollusca; not by the process of "absorption," as has been supposed.

Mr. PHILLIPS explained more fully the nature of the boring process carried on by these animals, and thought the author of this paper had thrown much light on the subject. Granules on the tongue of many of the Mollusca had been long known. They appeared to be of a siliceous character.—Prof. OWEN stated that there were no *à priori* objections to the theories opposed by the author, and one or another had been adopted by naturalists to explain the phenomenon of boring. At the same time, the inadequacy of these theories for the explanation of some cases had led him to regard the foot and mantle as engaged in the operation,—how he now, for the first time, was informed. He still, however, thought that an exception ought to be made in the case of *Pholas navalis*, which he yet believed must burrow in wood by means of its shell.—Prof. E. FORBES said that having to write on this subject in his 'History of the British Mollusca,' he had carefully gone over the evidence in favour of all the views adopted, and was not unaware of those of the author. He found little evidence to support the theory of a solvent being employed or of the agency of ciliary currents; but he found as little in favour of the siliceous particles of the author. He had carefully examined *Saxicava*, and could find no siliceous granules. Mr. Henfrey had examined these creatures under the microscope, and had failed to detect anything of the kind. A chemical examination made by Mr. Henry had also failed to detect them. He did not deny that they might be present in *Clavagella*. Under these circumstances, he had endeavoured to take an eclectic view of the subject. The different substances into which these animals penetrated might require different means. Some species of the genus *Pholas* bored in wood, some in stone, but none in both.—Mr. Hancock had referred to a species of sponge, the *Clione*, as a borer. This animal was undoubtedly irritable, but he doubted if it made itself the holes which it occupied.—Mr. BOWERBANK could bear testimony to the irritability of *Clione*, but he did not believe that it bored. He believed it to be a true sponge. It has spiculæ and tubes like a *Halichondria*. With regard to the application of the author's theory to the absorption of the columella of shells, he did not think it was necessary, as the researches of Dr. Carpenter and himself had shown that the shells of the Mollusca were organic and susceptible of absorption.—Dr. CARPENTER had seen in the borders of the mantle of Terebratula siliceous particles in the form of spines. It was not necessary that the granules should be silex, as any hard substance would be sufficient for the purpose. He had seen Pholades in such a position in an excavation as to render it impossible that they should have turned round for the purpose of boring.—Mr. JEFFREYS stated that he had observed that the tongues of many forms of Mollusca were constantly renewed in the manner mentioned by the author as occurring with the siliceous granules.—The PRESIDENT drew attention to a fact stated by Mr. Osler in his paper in the *Philosophical Transactions* on the boring of mollusks, that in one instance he had observed that the *Saxicava rugosa*, in boring through a calcareous rock, had been arrested in its course by a layer of argillaceous matter, thus lending great support to the solvent theory.

Prof. E. Forbes and Mr. M'Andrew exhibited living specimens of animals dredged off the coast of Wales. Amongst these were several individuals of a species of the beautiful genus *Velella*—the structure of which was explained,—and several specimens of the animal referred to above, *Clione celata* of Grant, also the hydra form of a species of Medusa. They had also captured specimens of *Cyanea coccinea*, and of the rare medusa *Willsia stellata*.

FRIDAY.

'On the Developement and Change of the Teeth in the Kangaroos; and on the Homologies and Notation of the Teeth in Mammalia,' by Prof. OWEN.—The Professor commenced by observing, that one of the results of the determination of the homologies of parts of the animal body was the power of denoting them by symbols,—and gave, in illustration of the advantages of this substitute for verbal definitions, some descriptions of the order of developement and change of dentition in different mammalia, and especially in the genus *Macropus* (Shaw). He had shown that the formula which had been supposed by Cuvier to distinguish the small kangaroos (*Halmaturus*) from the *Macropus* of Cuvier was the same essentially in both genera,—the differences depending only on the length of time during which certain teeth were retained. The true formula of the *Macropodidæ* was—

$$i\frac{3-3}{1-1},\ c\frac{0-0}{0-0},\ p\frac{1-1}{1-1},\ m\frac{4-4}{4-4}=28.$$

The canines are never functionally developed,—though minute germs occur in the upper jaw of some of the smaller species, and in the embryo state of all kangaroos. The author had not described the changes of the teeth, or given the deciduous formula of the kangaroos, in his 'Odontography;' nor had any additional information been given in later works. Mr. Waterhouse, in his 'Natural History of Mammalia,' had confirmed the author's determination of the permanent formula of the dentition of the *Macropodidæ*, and had abandoned the Cuvierian one of *Macropus major*. The deciduous dentition was—

$$i\frac{3-3}{1-1},\ c\frac{1-1}{0-0},\ m\frac{2-2}{2-2}=18.$$

When the young kangaroo quits the pouch, the *d i i* (milk incisors) and *d c c* (milk canines) are shed, and the dentition is

$$i\frac{1-1}{1-1},\ m\frac{2-2}{2-2}=12.$$

The incisors were *i* 1 (first permanent incisors); the molars were *d* 3 and *d* 4 (the milk molars, homologous with those so numbered in the typical dentition of the horse, hog). The next stage in the kangaroo is the acquisition of *i* 2 (second permanent incisor) in the upper jaw, and of *m* 1 (first permanent true molar) in both jaws; formulized by—

$$i\frac{2-2}{1-1},\ d\,m\frac{2-2}{2-2},\ m\frac{1-1}{1-1}=18.$$

At one year old the dentition was—

$$i\frac{3-3}{1-1},\ d\,m\frac{2-2}{2-2},\ m\frac{2-2}{2-2}=24.$$

The next stage is the shedding of *d* 3, and the appearance in place of *m* 3. Then *d* 4 is shed, and succeeded by *p* 4—the single premolar, which displaces *d* 4 vertically. Finally, *m* 4, the last true molar, comes into place; and in *Macropus gigas* the premolar is simultaneously shed. Thus four individuals of the great kangaroo may be found to have the same numerical molar series; viz. $m\frac{4-4}{4-4}$, and yet not any of them have the same or homologous teeth. The four grinders, for example may be—

d 3, *d* 4, *m* 1, *m* 2; or,
d 4, *m* 1, *m* 2, *m* 3; or,
p 1, *m* 1, *m* 2, *m* 3; or,
m 1, *m* 2, *m* 3, *m* 4.

Prof. Owen—not having traced out, when he published his 'Odontography,' all this complex interchange and alternating sequence of the dentition of the kangaroo—had been compelled to postpone any definition of the deciduous formula until all the stages had been traced. The order described was not that followed in some of the smaller kangaroos. In *Macropus Benettii*, *e.g.*, the acquisition of *m* 3 is not accompanied by the shedding of *d* 3. A skull of that species, five inches in length, had $m\frac{5-5}{5-5}$; being *d* 3, *d* 4, *m* 1, *m* 2, and *m* 3. Both milk molars are shed, and replaced by the single premolar *p* 4; but this tooth is not pushed out by the rising into place of the last molar, *m* 4. Hence the mature dentition shows 5 grinders on each side, or $p\frac{1-1}{1-1},\ m\frac{4-4}{4-4}$.

Thus the total number of molar teeth developed in the kangaroos is 28, consisting of 2 deciduous molars, 1 premolar, and 4 permanent molars on each side of both jaws. The deciduous molars were the homologues of those in the human subject: viz. *d m* 3 and 4; the premolar is the homologue of the second bicuspid, or *p* 4; the three anterior molars answer to the three true or tuberculate molars in man, viz. *m* 1, 2, and 3; the fourth molar in the kangaroo is a supernumerary tooth.—After describing other particulars, in which the proposed notation for the individual teeth was exemplified, Prof. Owen proceeded to observe, that the substitution of signs for verbal descriptions was at once the power of the algebraist and the proof of the exactness of mathematical reasoning. To gain the like power for anatomical science should be the chief aim of its cultivators. To this end the determination of the homologies of parts was the indispensable step,—which should be followed by denoting the part by a symbol, indicating it under all its modifications of form, and in all the species of animals in which such part existed. As an example of the amount of information which might thereby be conveyed in a small compass, several illustrations were given,—amongst which were the following:—The permanent dentition of the *Anoplotherium* was—

$$i\frac{3-3}{3-3},\ c\frac{1-1}{1-1},\ p\frac{4-4}{4-4},\ m\frac{3-3}{3-3}=44.$$

This was stated to be an example of the typical series of teeth in the placental Mammalia with true premolars. The deciduous dentition of the *Anoplotherium* was—

$$i\frac{3-3}{3-3},\ c\frac{1-1}{1-1},\ d\,m\frac{4-4}{4-4}=32.$$

d m 1 was succeeded by *p* 1, *d m* 2 by *p* 2, *d m* 3 by *p* 3, *d m* 4 by *p* 4; but *m* 1 was in place before *d m* 1 was shed: *m* 2 was coincident with *p* 1 and *p* 2; next came *m* 3 and *p* 3; and then, coincidently, *p* 4 and *m* 3. The permanent dentition of the horse was—

$$i\frac{3-3}{3-3},\ c\frac{1-1}{1-1},\ p\frac{3-3}{3-3},\ m\frac{3-3}{3-3}=40;$$

its deciduous dentition is—

$$i\frac{3-3}{3-3},\ c\frac{1-1}{1-1},\ d\,m\frac{4-4}{4-4}=32.$$

d m 1 is not succeeded by *p* 1; the other three, *d m m*, are succeeded by teeth which answer to *p* 2, *p* 3 and *p* 4 of the *Anoplotherium*. In the dog, on the other hand, there are $p\frac{4-4}{4-4}$, but only $d\,m\frac{3-3}{3-3}$; *p* 1 is not preceded by a calcified *d m* 1, and the *d m m* (deciduous molars) in use answer to *d m* 2, *d m* 3 and *d m* 4 in the horse and *Anoplotherium*.

The permanent molars of the dog are $\frac{2-2}{3-3}$, answering to *m* 1 and *m* 2 in the upper jaw, and to *m* 1, *m* 2 and *m* 3, in the lower jaw of the horse. With regard to the human subject, of which the deciduous and permanent teeth were formulized in the author's 'Odontography,' the first *d m* answers to *d m* 3 in the dog, horse, &c.; and is succeeded in the 8th year by a *p m*, answering to *p* 3; and *d m* 4 is succeeded by *p* 4 before the completion of the 10th year: *m* 1 usually makes its appearance in the 6th year; *m* 2 between the 12th and 14th years; *m* 3 at or after the 18th year, whence it is called the "wisdom tooth." Now, the description of the foregoing anatomical facts by the ordinary language and

verbal definitions of the teeth would occupy about five pages of the type used in Bell's 'Anatomy.' And one disadvantage attending such tax upon the efforts of the attention and memory, was to enfeeble the judgment in forming its conclusions, and to impair the power of seizing and appreciating the results of the comparisons. Prof. Owen concluded by stating his conviction, that nothing would influence more the rapid and successful progress of the knowledge of the structure of animal bodies, than the determination of the nature of the parts by tracing their homologies, and the condensation of the propositions respecting them by attaching to the parts so determined symbols, or, at least, single substantive names, distinctly defined: the bones might be denoted by simple numerals, as was proposed in his work on the 'Archetype of the Skeleton.' And the effect of the few symbols for the teeth, which, when explained, were so easily remembered, had been shown to be to render unnecessary the endless repetition of the verbal definitions of the parts, to harmonize conflicting synonyms, to serve as a universal language, and to convey the writer's meaning in the fewest and clearest terms. The entomologist had already partially applied this principle with much success, and the signs ♂ and ♀ for male and female constantly occurred; the astronomer had early availed himself of it in the signs ☉ and ☽ for the sun and moon, and in the different symbols of the planets, &c.; and Mr. Babbage has advocated the use of this powerful instrument of discovery in geometrical science in his Paper 'On the Influence of Signs in Mathematical Reasoning.'

Dr. Carpenter remarked on the value of comparative researches in the developement of organs, and felt that Prof. Owen's proposed system of notation would be of the greatest value to zoologists. He inquired the relation between the true molars and the milk teeth in the human being.—Prof. Owen regarded the true molars as more analogous to the deciduous molars than to the pre-molars.—Prof. E. Forbes believed that this paper would be the commencement of a new era for zoology,—and that a system of notation would be much the most efficient mode of describing the parts of animals.

'On the Eustachian Tubes in the Crocodiles,' by Prof. Owen.

'On the Structure and Functions of Branchial Organs of the Annelidæ and Crustacea,' by D. T. Williams.—The author stated that he had arrived at the following conclusions:—

1st. That ciliary epithelium is not universally present on the breathing organs of invertebrate animals.

2nd. That as far as his researches into this subject have extended, no anatomical conditions can be accurately defined as co-existing with, and indicative of, the presence of ciliated epithelium on the branchial organs.

3rd. That the principle is invariably observed, except only on those examples in which the respiratory organs are not expressly localized, of reducing, in every practical manner the thickness of all structures, and, therefore, that of the stratum of epithelium intervening between the external air and the circulating fluids; and that this principle necessarily involves the flattening of the true branchial and pulmonary epithelial cells.

4th. That comparative anatomy establishes the fact, that in invertebrate animals the figure of the nucleated cells is not distinctive of the several structures of the organism, and that the oval form of cell, which is the predominant variety in molluscous animals, is the product merely of mechanical forces, acting from the interior, and caused by the accumulation of the fluid contents, and is significant of an inferior degree of formative power; and that the prismatic order of cells, common on the mucous structures of vertebrate animals, by the preservation of their own peculiar figure, denote a higher grade of organizing energy.

5th. That in consequence of the immediate agency of atmospheric oxygen upon the contents of superficial epithelia, under which class the ciliated order was, of course, comprehended, no oily and adipose constituents could accumulate in the chamber of the cell; and that with reference to the vibratile epithelium, the glandular character of the cell, as indicated by the presence of molecules and oily particles, was sacrificed to the developement of its motive appendages.

6th. That since the internal surface of the lungs of air-breathing vertebrata are lined by a layer of mucus more or less dense, the oxygen of the air in passing into the blood is fluidified by solution in the mucus; or if the idea of gaseous liquefaction be disallowed, dissolved before the penetration of the vascular parietes, it follows in every essential respect that a pulmonated air-breathing animal presents no exception to the general physical laws which govern the process of *aquatic* respiration.

7th. That the presence of ciliary vibration, as proved by recent observation on the lungs of batrachian, ophidian, chelonian, and saurian reptiles, being air-breathing animals, establishes the importance and probable necessity of motive epithelium as an element of structure in the respiratory organs of all vertebrate animals, and that analogy strongly supports the belief that in the lungs of birds and mammalia ciliary vibration will be eventually discovered.

8th. That while the general conformation, disposition, and magnitude of glandular organs acquire complexity proportionately to the elevation of the animal in the series, the ultimate elements of structure, such as nucleated cells, present equal perfection in the lowest and highest members of the zoological scale—unless the oval figure, as formerly observed, be acknowledged as a mark of inferiority.

The author then proceeded to a minute account of the vascular system of the respiratory organs in the Annelidæ and Crustacea. The blood-system of the branchiæ in the annelides were reducible to three leading systems—those, firstly, typified by the Arenicola, Serpulæ and Terebellæ, in which the vessels projected out from the cephalic or lateral portions of the body to a distance more or less considerable, the branchial filaments or threads presenting various subdivisions. In these organs, Dr. Williams maintained that, contrary to the description of all systematic writers, the blood vessels consisted of an afferent and efferent channel, in which the blood respectively flowed and returned, and that it did not consist of a single conduit, in which a flux and reflux of the fluid had been supposed to occur. In the Nereidæ, exemplifying the second type, the vessels were subdivided into a system of parallel capillaries, which inclosed after the manner of a frame-work the branchial mammillary protuberances; and that in the third, illustrated by the suctorial or abrancheate annelides, the respiratory tubes and sacculi were furnished with a system of reteform capillaries, distinguishing anatomically these species of annelides from all others. Of the Crustacea the author grouped the respiratory organs under the two principal divisions of internal and external, which respectively again were distributed under a lamellar and tubular order. The dense, corneous integument of the Crustacea was described as in *all* species constituting an inelastic investment to the true blood channels, and intervening between the circulating fluid and the surrounding medium.

Prof. Owen said that nothing could better illustrate the value of the microscope in zoological researches than the paper just read. He hoped Dr. Williams would continue his labours even though he should go over the same ground as others. It would be of value as confirming their observations.—Dr. Carpenter differed from the author as to the value which he attached to the size and form of the epithelium cells. These cells were found of all forms and sizes in different parts of the same forms of lower animals. The distinction made between the ciliated cell as a motory cell and the plain cell as a secreting cell was of importance. Cilia were not present on the gills of fishes. It was not a necessary inference that there were cilia in the air cells of lungs.—Mr. Bowerbank had never been able to detect cilia on the structure of sponges, although the movements of the fluid in their interior was very rapid and obvious. He had observed the oscillating circulation described by Dr. Williams in the tentacles of Annelides. In the tail of a species of Ephemera there was a similar circulation. He described the circulation in Pycnodon as being carried on in a sac surrounding the alimentary canal, but not prolonged into the legs with that canal, as supposed by Quatrefages.—Prof. E. Forbes especially urged on Dr. Williams the importance of studying the structure of the Annelides. In this family there was a wide field to reward the research of the comparative anatomist and zoologist.

'On a Peculiarity in the Protococcus Nivalis,' by M. Moggridge, Esq.

Dr. Lankester made some remarks 'On Vegetable Monstrosities.'—After drawing attention to the fact that all the parts of a plant are modifications either of the stem or leaves, he exhibited specimens and drawings of several plants confirmatory of this fact:—1. A specimen of the common furze, in which the spinous leaves were converted into broad expanded leaves. 2. Specimens of two species of plantain, in which the bracts at the base of the flowers were converted into leaves. 3. Specimens of the common radish, in which the stamens, petals and sepals were converted into leaves. 4. A specimen of the common goats'-beard, in which the pappus, florets and style were converted into leaves. 5. The capsule of a poppy from the interior of which projected four leaves partly converted into a capsule. 6. Gooseberries, in which the fruit bore upon its surface small bracts or leaves. The author believed that the production of this tendency on the part of the more highly developed parts on the axis of the plant into the lower forms depended on over-nutrition, produced by cultivation, or the attacks of insects. In cases of under-nutrition, there was a tendency to develope the stem or formless masses of tissue, as seen in various forms of vegetable excrescences.

Mr. Babington agreed with the author in the cause of these monstrosities, and described a peculiar multiplication of the flower of Atriplex when growing in cultivated ground. The specimen of furze exhibited he regarded rather as an expansion of the stem than of the leaf. The most interesting of Dr. Lankester's monstrosities was the Tragopogon, in which the hair-like pappus of that plant was converted into foliate appendages.—Mr. Henfrey said that the monstrosities might be reduced to two classes—those which threw light on the structure of the vegetative, and those which illustrated the structure of the reproductive organs. Of these, the last were by far the most important. The monstrous poppy capsule he regarded as a confirmation of the view that the placenta and ovules were formed from the carpellary leaf, and were not independent of that organ. In the monstrous *Trifolium repens*, mentioned by Dr. Lankester, he had found ovules on the edge of the legume, which was converted in every other respect into a perfect leaf.—Mr. Thwaites related a case of monstrosity in the vegetable marrow—in which between the sepals and stigma of the fruit there appeared two bodies like crumpled leaves which were covered with ovules.—Dr. Wallich said that if any argument were wanting to show that that illustrious chief of botanists, Brown, was right in regarding the ovules as the production of the carpellary leaf, it would be found in the Sterculias where the carpellary leaf was prolonged into a foliate organ, at the same time that the ovules and seeds were attached to its edges at the base. He could not sit down without alluding to the fact that the doctrine of morphology in plants was first laid down by Linnæus in his '*Prolexis Plantarum*.'—Mr. Bentham said that vegetable monstrosities were of two kinds: those produced by the attack of insects and fungi, and those produced under natural circumstances. The last were by far the most interesting. He thought there was no objection to the supposition that the placenta and ovules might be produced in two ways: in some cases independent of, and in others from the carpellary leaves. In the case of the poppy the abnormal leaves might be regarded as axillary placentæ.—Prof. E. Forbes referred to a monstrosity of *Primula sinensis*, described by Brongniart, in which the ovules were produced on an axis independent of the carpellary leaves. In the Tragopogon the small number of leaves taking the place of the pappus, would lead to the inference that the pappus was not the representative of a leaf, but of the veins of a leaf.

MONDAY.

SUB-SECTION.—ETHNOLOGY.

Vice-Presidents—Dr. Latham, Rev. J. M. Trahearne, Dr. C. Meyer, Dr. Hodgkin.

Secretary—Mr. G. G. Francis.

Committee—Messrs. G. B. Greenough, E. Guest, W. Spence, Sir C. Malcolm, Mr. W. D. Saull, Dr. Beke, Archdeacon Williams, Mr. J. Hogg, Sir E. Belcher, Dr. Wood, Dr. Fowler, Prof. Elton, Prof. Rogers, Dr. Fisher.

'Remarks on a Uniform System to reduce Unwritten Languages to Alphabetic Writing in Roman Characters,' by Sir R. Schomburgk.

Prof. Elton read a paper 'On the Ante-Columbian Discovery of America.' He said that memorials of the past, and especially such as related to the discovery of a great continent, had excited peculiar interest in the human mind in all ages and among all nations. He would state a few facts exhibiting evidence that America was known to Europeans as early as the tenth century. An Icelandic historian, Torfæus, in the year 1805, claimed for his ancestors the glory of having discovered the New World. This claim had been strengthened by a work published by the Royal Society of Antiquaries at Copenhagen in 1837, and which had imparted a new impulse to this subject. The work was entitled 'Antiquitates Americanæ, sive Scriptores Septentrionales Rerum Ante-Columbianarum in America.' It was edited by the learned Prof. Rafn, of the University of Copenhagen, and published in the original Icelandic, and

accompanied by a Danish and also a Latin translation. This work gives an account of the voyages made to America by the Scandinavian Northmen during the tenth, eleventh, twelfth, thirteenth, and fourteenth centuries. Their accounts of their early voyages are published from authentic manuscripts which are dated as far back as the tenth century. From this work it would appear that the ancient Northerns explored a great extent of the eastern coasts of North America, repeatedly visited many places in Massachusetts and Rhode Island, fought and traded with the natives, and attempted to establish colonies. The most northern region they called Hellaland (*i.e.* slate land), the country further south they named Muckland (woodland), and the country most southern they called Vinland (vineland),—which is supposed to have extended as far south as Massachusetts or Rhode Island. The general features of the country accord with the descriptions which they have given. The discovery of America by the Northerns is confirmed by an inscription on a rock on the bank of the river Taunton, at a place called Digleton, in the State of Massachusetts, and which until recently had defied all efforts at interpretation. The earliest New England colonists observed the mysterious characters on this rock; and more than 150 years ago Dr. Cotton Mather, of Boston, sent an imperfect drawing of the inscription to the Royal Society. It also attracted the notice of the Rev. Dr. Styles, President of Yale College, nearly 100 years ago, who sent *fac-similes* of the inscription to many learned societies in Europe,—but all attempts to decipher them were in vain. An accurate drawing of the inscription was made by the Rhode Island Historical Society a few years since, and a copy was sent to the Royal Society of Northern Antiquities at Copenhagen, which led to a more satisfactory result. The surface of the rock which bears the inscription is about 12 feet in length and 9 feet in height, and is covered with hieroglyphics forming three distinct lines. The characters are deeply engraven in greywacke, and must have required the labour of several days. The lower part of the rock is subject to the constant action of the tide, in consequence of which several of the characters are obliterated. The word "Thorfinus" and the number "132" are distinctly marked. The "Th" in the Thorfinus are in Icelandic characters, and "orphinus" in the ancient Roman. The 132 was also engraved in the ancient Roman form of writing numerals. The circumstance of the Roman letters being used may be easily explained. Christianity was introduced into Iceland about the end of the tenth century,—at which period there was evidence that the Latin language was cultivated in that country at least by individuals. Now, there is a remarkable coincidence between the monument just described and an account in one of the manuscripts published in the 'Antiquitates Americanæ.' It is there stated that Thorfinus, an Icelandic chief, made a voyage to Vinland in the year 1000; and that in the course of three years he was killed in a battle with the natives. It is worthy of observation, as proving that they had some knowledge of Christianity, that a cross was placed at the head of his grave. The particulars of Thorfinus's voyage and his frequent battles with the natives are also minutely recorded. His wife, who accompanied him to America, returned after his death to Iceland with her son, who was born in America. This son of Thorfinus became a chieftain; and from him, according to genealogical tables, are descended many eminent men, including Prof. Finn Magnussen and the celebrated sculptor Thorwaldsen. The author concluded by alluding to the supposed discovery of America by Prince Madoc in the twelfth century; the only information respecting which was received from the poems written by Meredyth-ap-Rhys in 1478, of Gatyr Owen in 1480, and Cynfyn-ap-Gronw, who lived in the same period.

Sir R. SCHOMBURGK read a paper 'On certain Tribes of Guiana':—showing that originally they must have sprung from one common stock, inasmuch as their different dialects could be arranged in cognate sets, which sets were still further related to each other. He produced several instances to show that a strong similarity existed between certain terms used by the different tribes,—and that all dissimilarity vanished on making strict and accurate comparisons.

'On the Geographical Distribution of the Languages of Abyssinia and the neighbouring Countries,' by Dr. BEKE.—This paper was confirmatory of the views laid down by Dr. Latham in reference to African languages. The writer noticed particularly the group in Abyssinia and its neighbourhood—stating their coincidences and their minute variations. The conclusion at which he arrived was that Dr. Latham had exhausted the subject; and that though subsequent inquiries might modify his conclusions, they would tend materially to confirm them. Remarks were made by Dr. Latham, Mr. E. Guest, Sir C. Malcolm, and several others, coinciding with the views of the author.

A paper by Archdeacon WILLIAMS was read tracing a relationship between the Gaels, the Irish, the Welsh, the Bretons or Armoricans, and the Cornish or the Basques.

THURSDAY.

SECTION F.—STATISTICS.

President—Mr. J. H. VIVIAN.

Vice-Presidents—Sir C. LEMON, Mr. T. TOOKE, Lieut.-Col. W. H. SYKES.

Secretaries—Mr. J. FLETCHER. Capt. B. SHORTREDE.

Committee—Mr. W. Spence. Dr. Beke, Col. F. P. Lester, Mr. L. Horner, Rev. E. Wyatt-Edgell, Messrs. C. B. Fripp, W. Harding, J. Heywood, Sir J. Guest, Mr. P. Dickson, Dr. C. Finch, Dr. Carpenter, Messrs. J. M. Strachan, G. S. Kenrick, Prof. Elton, Mr. W. Gilbart.

Col. SYKES read a paper, contributed by E. Balfour, Esq., comprising his observations 'On the Means of maintaining the Health of Troops in India.'—It commenced by stating, contrary to the opinion of Col. Sykes, that no sufficient data were given in a pamphlet published by the latter to support the idea that "habits of life" or "the quantity of spirits consumed" by the army in India are the chief cause of disease. Intemperance would be found to add but a very small proportion to the deaths from climatorial diseases, which were known to continue in spite of the most regular and temperate habits. There seemed to be an unjust impression abroad that a soldier was a very intemperate character; but it would be found that other classes of our countrymen did not enjoy a greater immunity from disease. What was the proportion of deaths amongst the highly temperate civilians of India, who were the most intelligent, best clad, best paid, best lodged, and most independent servants of the Indian Government? Although the mortality amongst the same class in England from 1801 to 1832 averaged only 9·1 per 1,000 annually, according to the accounts of the Equitable Insurance Society, yet Mr. H. T. Prinsep iniormed them that in the twenty years from 1809 to 1828 inclusive the Madras civilians lost 23·8 per 1,000 of their strength, the Bengal civilians 25·1 per 1,000, and the Bombay civilians 31·7 per 1,000. Tables were read to show that the human race enjoy better health in their own than in any foreign country, whatever may be their rank, duties, or comforts. The paper concluded by observing that some deaths may, no doubt, be attributable to the nature and duties required by a military life, yet in most cases they are attributable to the climate of the locality in which soldiers serve.

Col. SYKES read a paper, supplied by J. Crawford, Esq., 'On the Vital Statistics of a District in Java,' with preliminary notes of his own.—The statistics went to prove that in the city and neighbourhood of Yugyakarta, to which locality the observations were chiefly confined, the births were fewest and the mortality greatest in the town, while the opposite state of things prevailed in the country, and especially in the more elevated part; and also to show that a native population under the tropics, in the enjoyment of peace, with a fair share of industry, a sufficiency of fertile land, and a favourable climate, may increase as an European one in a temperate climate with similar advantages.

J. FLETCHER, Esq., read a statement communicated by Mr. Hume, M.P., 'On the Annual Increase of Property, and of the Exports and Imports, in Canada,' demonstrating the great rapidity with which the most valuable and permanent species of wealth accumulates in Canada, and the extent to which the province is already able to consume and employ goods of various kinds sent from this country, and to pay for them by its exports to Great Britain and its dependencies. That power will henceforth increase annually, at a rate greatly exceeding that of former years, under the influence of a principle long recognized. An inquiry into the amount of the banking and mercantile capital employed in the trade, shipping, and agriculture of Canada would strengthen and greatly extend these results. The rateable property in Upper Canada amounted in 1825 to 997,025*l.*; in 1840 to 5,691,477*l.*; in 1841 to 5,996,609*l.*; in 1842 to 6,375,140*l.*; in 1843 to 5,916,162*l.*; and in 1844 to 7,139,901*l.*, according to the assessment returns for the last three years. In the united province of Upper and Lower Canada the imports by sea from 1838 to 1847 inclusive increased. On comparing a few of the more important articles of import by sea for the years 1846 and 1847 the following results are obtained:—Against 313,076 gallons of wine imported in 1846, there are 229,595 gallons in 1847. In spirits of all kinds, exclusive of whiskey and East and West India rum, 159,547 gallons in 1846 against 185,367 gallons in 1847. In molasses, 151,675 gallons against 365,450 gallons. In refined sugar, 895,046 lb against 880,305 lb. In Muscovado and bastard sugars, 8,546,982 lb against 8,719,099 lb. In coffee, 105,282 lb against 261,144 lb. In tea, 603,038 lb against 816,866 lb. In salt, 345,396 bushels (equal to 11,513 tons) against 87,880 bushels (equal to 2,929 tons). And in goods paying *ad valorem* duties, 2,241,154*l.* sterling against 1,783,682*l.* sterling. On comparing the exports of 1846 with those of 1847, it will be seen that the exports of the agricultural staples of Canada exhibit a steady increase. For instance, the export of flour in 1846 was 555,602 barrels against 651,030 barrels in 1847. The export of wheat was 534,747 bushels in 1846 against 628,001 bushels in 1847. That of oatmeal, 5,930 barrels against 21,999 barrels. That of oats, 46,060 bushels against 165,805 bushels. And that of butter, 786,701 lb against 1,036,555 lb. Of ashes, however, and timber there was a falling off, but it was probably more than compensated by an increased export inland.

FRIDAY.

'On the Statistics of Brittany and the Bretons,' by Mr. J. FLETCHER.—The materials for this paper were obtained principally from statistical inquiries instituted by the French government into the social, educational, and physical condition of this remote province of the French empire. It would appear that there are peculiar conditions in the holding of lands in Brittany which give rise to interesting statistical features. Far removed as Brittany is from the great influences which are the agents of civilization,—inconsiderable as are its commerce and natural resources for trade,—purely agricultural as is its character,—the proportion of the population to the area of its soil is greater than in any other part of France. The disproportion of age in marriages in Brittany was one of the social indications to which the lecturer referred. The average age of the woman is thirty-five, that of the man thirty years. The Breton is represented as holding to the place of his birth, obstinate in his prejudices, adhering firmly to the customs and habits of his ancestors, not even applying modern improvements in agriculture, and devotedly attached to the language of his province. Education is represented as deficient; although since its introduction in 1833, great progress has been made in this particular—a result to which opposition to the scheme of education established by the French Government, by certain religious bodies such as the "petits frères," has contributed.

Col. SYKES made some comments on the comparative condition of the Bretons and the Welsh—the comparison, however, was highly favourable to the superior progress of Wales.—Archdeacon WILLIAMS thought that the statistical statements embodied in the paper should be received with caution, as they appeared to be based on an inquiry into the least favourable parts of Brittany.—Col. SYKES was of opinion that it was too much for them to assume that a report which had been prepared under the auspices and for the purposes of the Government of the country was partial in its character, or founded on insufficient data.

'On the Statistics of the Legal Affairs of the Government of Bengal,' by Col. SYKES.—This contribution to the statistics of our dependencies tended to throw much light on the conduct of the English Government in the Bengal department of our dependencies in the East. Though the English rule in India is based on military power, it recognizes

the just principle of allowing the Hindoo of Bengal at least to sue for a remedy through his course of law, even where the Government is itself the defendant. The details of a large class of cases illustrative of this position were given.

Prof. POWELL produced some contributions to Academical Statistics,—showing the number of students that entered Oxford during the last eight years, and the number who graduated, and the rank which they attained in graduation;—the results of which harmonized with statistics given on former occasions.

THURSDAY.

SECTION G.—MECHANICAL SCIENCE.

President—The Rev. Prof. WALKER.
Vice-Presidents—Messrs. J. GLYN, J. SCOTT RUSSELL, J. TAYLOR.
Secretaries—Messrs. R. A. LE MESURIER, W. P. STRUVE.
Committee—Messrs. J. S. Enys, J. Farey, A. Fox, T. Froude, W. Harding, B. Hill, Prof. E. Hodgkinson, Messrs. R. Hopkins, G. Lowe, G. Rennie, R. Roberts, R. Stephenson, J. Taylor, jun., R. Taylor, F. Whishaw.

J. GLYN, Esq. read a paper 'On Hydraulic Pressure Engines';—in which he called the attention of the members to a mode of employing the power of waterfalls in a most useful and important manner—too long neglected in this country, considering the advantages it affords in hilly districts for the drainage of mines. He brought under their notice the means of employing high falls of water to produce a reciprocating motion by means of a "pressure engine." The pressure engine acted by the power of a descending column of water upon the piston of a cylinder to give motion to pumps for raising water to a different level, or to produce a reciprocating motion for other purposes. The pressure engine was calculated to give great mechanical effect in cases where waterfalls may be found of much too great a height and too small a quantity to be practically brought to bear in a sufficient degree on waterwheels within the ordinary limits of diameter. The author produced instances of the desired pressure engine, one of which was constructed about forty years ago in Derbyshire—and which he believed was still at work in the Alport Mines, to which it was removed from its original situation. The cylinder was, he believed, 30 inches in diameter. In 1841 Mr. John Taylor advised the application of another and more powerful engine at the Alport Mines, which was made under his (Mr. Glyn's) direction at the Batterby Ironworks in Derbyshire. This was the most powerful engine that had been made. The cylinder was 50 inches in diameter, and the stroke 10 feet. It was worked by a column of water of 132 feet in height, so that the proportion of power to act on it was as the area of a piston to that of the plunger—namely, 1,963 to 1,385, or fully 70 per cent. The superintendent of the machinery assured him that the engine had never cost them 12*l.* a-year since it was erected. Its usual speed was about 5 strokes per minute; but it was capable of working at 7 strokes per minute without any concussion in the descending column, the duty actually done being equal to 163 horse-power:—Area of plunger, 9·621 feet × 10 feet × 7 strokes = 673·41. $673{\cdot}41 \times 62{\cdot}5 \times 132 = \frac{5555625}{33000} = 163$ horse-power. The author concluded by remarking that, in this case as in all others when water acts by its gravity or pressure, those machines do the best work when the water enters the machine without shock or impulse and quits it without velocity. They thereby obtain all the available power that the water will yield with the least loss of effect; and this result is best accomplished by making the pipes and passages of sufficient and ample size to prevent acceleration of the hydrostatic column.

Mr. F. WHISHAW read a paper 'On the Velocentimeter' with its applications.—He stated that in the year 1837 he was engaged in working the general survey of the railways in Great Britain and Ireland; and that he invented the first velocentimeter for the purpose of testing more readily than by the ordinary watch furnished with a second hand the time occupied in passing over measured distances, which were usually marked by posts or standards. He now exhibited an improved instrument which resembled a handsome chronometer—and observed that it had tabulated thousands of miles without being out the hundredth part of a minute. He stated that by it, with the assistance of the electric telegraph, the time of the United Kingdom could be made uniform to half a second.

'On a New Element of Mechanism,' by Mr. R. ROBERTS.—The writer explained the construction of a contrivance by which he effected in a very simple manner movements for which more complicated mechanism was frequently employed. The model consisted of a steel stock shaft, on which were fitted two brass discs in such a way as to be kept steady. One of the discs had eleven teeth rounded at the top and bottom in its circumference, and was placed on the body of the shaft. The other disc which was rather the larger, was in the eccentric position of the shaft, with its face to that of the toothed disc. The plain disc had four studs rivetted into it at equal distances from each other and at such distances as to admit of their being brought successively, by the revolution of the eccentric, to the bottom of the hollows in the toothed disc. The following movements may be effected by this model:—viz. if the shaft be held stationary and the discs be made to revolve upon it, one of the discs will make twelve revolutions whilst the other only makes eleven. Again, if the toothed disc be held whilst the shaft be made to revolve twelve times, the plain disc will revolve, in the same direction, one revolution only; and if the plain disc be held, the toothed disc will perform one revolution in the contrary for eleven revolutions of the shaft. It would be evident that almost any other number of revolutions may be produced by employing a smaller number of studs, not fewer than three, which will not divide the number of teeth in that disc. The idea of this novel element in mechanics was suggested to Mr. Roberts by a dial movement in an American clock.

'On the Ventilation of Collieries, with a Description of a New Mine Ventilator,' by W. P. STRUVE.—Mr. Struve proposed to substitute for the present system of furnaces a ventilator worked by a five horse-power engine, calculated to take out of a mine an unlimited quantity of air—this he does by converting the whole area of the upcast pit into an air channel, which he connects with his ventilator by means of a culvert of a similar size. The ventilator consists of two large air chambers, something like gasometers, which he causes to move up and down in water contained in a tank constructed of masonry; the chambers balance each other, and are surrounded with outside cases so as to form double pumps: the inlet and outlet valves, when open, present the same amount of area for the ingress and egress of the air as the upcast pit, so that the only resistance to be overcome in ventilating the mine is what arises from the friction of the air in the passages of the mine and in the parts of the apparatus, which would be of small amount. He described one now erecting on this principle at the Eagle's Bush Colliery, calculated to pass through that mine 40,000 cubic feet per minute, the cost of which would be about 4,000*l.*

FRIDAY.

Mr. WHISHAW read a paper giving an Explanation of the various Applications of Gutta Percha; numerous specimens of which, in the shape of thread, cord, tubular staves, driving bands, constables' staves, sticks, whips, inkstands, medallions, shields, water buckets, stereotype plates, and almost every other description of article, both useful and ornamental, were present. The paper, after stating that gutta percha was the concrete juice of a large tree of the same name, abounding in Borneo, &c., obtained by tapping the tree periodically by the Malays, stated that its introduction into this country was purely accidental; Dr. Montgomery having transmitted the first sample of it to the Society of Arts in 1843, at which time he (Mr. Whishaw) was secretary to that Society. The first articles of use made of gutta percha in this country were laid before the Society of Arts in 1844, and consisted of a lathe-band, a short length of pipe, and a bottle-case, which he had himself made by hand, having caused the concrete substance to become sufficiently plastic by immersing it in hot water. He also produced casts from medals, which attracted considerable attention at the time, and surgical instruments were soon after made of this new material. It was also adapted to commercial uses; and from the period mentioned to July 11th in the present year between 600 and 700 tons had been imported for the Gutta Percha Company. From 20 to 60 tons were now regularly imported every month. Contrary to the general opinion that gutta percha is a simple, hydrogenous substance, Mr. Crane (chemist to the Gutta Percha Company) found it in its ordinary state to consist of at least two distinct materials, besides a notable proportion of sulphur—viz., 1. A white matter, gutta percha in its pure state; 2. A substance of a dark brown colour. Various experiments were made to ascertain its strength when mixed with other matters, and also as to what pigments would mix with it without rendering it brittle or deteriorating its qualities. From these it appeared that the only pigments that could altogether be relied on to be used with gutta percha were orange lead, rose pink, red lead, vermilion, Dutch pink, yellow ochre, and orange chrome. Under the influence of heat and pressure, gutta percha would spread to a certain extent, and more so if mixed with foreign matters. All the mixtures composed of gutta percha and other substances which had been subjected to experiment, except that containing plumbago, were found to increase its power of conducting heat; but in its pure state gutta percha was an excellent non-conductor of electricity. The best composition for increasing the pliability of gutta percha was that formed in conjunction with caoutchouc tar, and next in order that of its own tar; and the best material at present known for moulding and embodying was obtained by mixing gutta percha with its own tar and lamp-black. In describing the process of manufacturing gutta percha, the author observed, that rude blocks of the material were first cut into slices, by means of a cutting machine formed of a circular iron plate of about 5 feet in diameter in which there are three radical slots furnished with as many knives or blades. The blocks are placed in an inclined shoot, so as to present one end to the operation of the cutters. The slices are then placed in a wooden tank, containing hot water, in which they are left to soak until found in a plastic state. They are afterwards passed through a mincing cylinder, similar to that used in paper mills for the conversion of rags into pulp, and then thoroughly cleansed in cold water tanks; the water, in cases of impure gutta percha, being mixed with a solution of common soda or chloride of lime. It is next put into a masticating machine, such as is used in the manufacture of caoutchouc, and then pressed through rollers; thus being converted into sheets of various width and thickness. When necessary, the sheets are again masticated, and again passed through rollers. These sheets are subsequently cut into boards by vertical knives, placed at the further end of the table, along which the sheets are carried by a cloth or web to another roller, round which they pass, and are cut into the required widths. The bands or straps are then removed, and coiled up ready for use. Driving bands for machinery are thus made, and shoe soles and heels are stamped out of similar sheets of gutta percha. In making tubes or pipes, either of gutta percha or any of its compounds, a mass of gutta percha, after being thoroughly masticated, is placed in a metal cylinder furnished with a similar piston, by which it is pressed down into an air box, kept hot with steam, which has at its lower end a number of perforations, through which the plastic material is forced into a cup, whence it passes out, round a core, into the desired tubular form, and thence through a gauge to the required size, and into a receiver of cold water, being drawn to the other end of a long trough by a cord passing round a pulley at the far end of the trough, and returning to the person in attendance on the machine, who gradually draws the pipe away from the air machine. Thus tubes of considerable length and diameter are made to a very great extent, and are used for the conveyance of water and other liquids, and are now under test for the conveyance of gas. The paper next explained the variety of articles already made of gutta percha, which were of three classes—1. Useful; 2. Ornamental; and 3. Useful and Ornamental combined. Various articles were then exhibited, including two very handsome shields, and a splendid Communion Dish and Service.—Mr. Whishaw next exhibited the Telakouphanon, or Speaking Trumpet; and in doing so, said that speaking tubes of gutta percha were quite new, as was also the means of calling attention by them of the person at a distance, which was accomplished by the insertion of a whistle, which, being blown, sounded at the other end quite shrilly. Attention having been thus obtained, you remove the whistle, and by simply whispering, the voice would be conveyed quite audibly for a distance of

at least three quarters of a mile, and a conversation kept. It must be obvious how useful these telegraphs must become in large manufactories; and indeed in private houses they might quite supersede the use of bells, as they were so very cheap, and by branch pipes could be conveyed to different rooms:—and, indeed, if there were no electric telegraphs, they might, by a person being stationed at the end of each tube of three quarters of a mile or a mile, be made most speedily to convey intelligence for any distance. In private houses the whistle need not be used, but a more musical sound could be produced. He then amused the auditors by causing the end of the tube, which was of the length of 100 feet, to be inserted into the mouth-piece of a flute held in a person's hand, regulated the notes, and placing his own mouth to the other end of the tube, 'God save the Queen' was played at a distance of 100 feet from the person giving the flute breath. Turning to the Bishop of St. David's, he said that in the event of a clergyman having three livings, he might, by the aid of three of these tubes, preach the same sermon in three different churches at the same time.—Mr. Whishaw also exhibited the gutta percha submarine rope or telegraph; which consisted of a tube perforated with a series of small tubes, for the conveyance of telegraphic wire, and which, for the purpose of preventing its being acted upon by sea water or marine insects, was banded or braided round by a small rope, and its being perfectly air-tight would render it quite impervious to the atmosphere.

Mr. Scott Russell read a paper 'On the Improvements which have been made in Steam Navigation,' which he explained by appropriate diagrams.—The first great improvement that had been made was in the boilers. Formerly, the boiler flues were constructed of great length, so that the smoke was kept winding round and round in the flues and at last was allowed to escape with difficulty. Now, however, they had adopted the plan of getting as much fire as possible in the shortest space of time,—and this had been accomplished by imitating as nearly as they could the locomotive engine boiler, by having tubes of thin metal which would evaporate a much greater quantity of water in the same time as flues of the usual thickness; now, also, instead of taking the smoke a long dance as in the old fashion, they used short flues of four to six feet in length, and by having a great many of as thin metal as possible they heated the greatest quantity of water, and had the additional advantage of keeping the metal cool,—in consequence of which a boiler of smaller extent and surface was of much greater efficiency with less weight of metal. The next point of improvement was in the engine; in the construction of which, however, there had been less change than in other matters. The former beam engine had been changed for the direct action engine, which was of various kinds; but the greatest change which had been made within the last ten years consisted in the employment of greater quantities of wrought iron in the construction of the engines, instead of the mass of cast iron formerly used. This was the only great change,—for the newest Halifax steamers were still fitted up with the old-fashioned or lever engines. The next improvement consisted in working steam expansively to a much greater extent than heretofore. It was only within the last ten years that they had adopted this principle: the effect of which was that instead of completely filling the cylinder with steam, they filled only to the extent of one-fourth—a volume of steam not of course of equal density, but by which they got two-thirds of the work done and at one-fourth of the cost. The next improvement had been made in the paddle; not so much, perhaps, in the wheel itself—for he was still inclined in favour of the old paddle-wheel, although for short voyages he admitted the advantage of the feathering paddle-wheel which had been advocated by Mr. Price at their Meeting some years ago, and he had then opposed him:—but of this by-and-bye. Another great improvement which had been made was the driving the paddle-wheels faster. They had an old maxim which was, whereas a good old horse going 2½ miles an hour could not draw advantageously at more than 220 feet per minute and that as the steam-engine was only a substitute for horses, and reckoned as so much horse-power, it ought not to go faster than 2½ miles per hour—and this one thing had kept them back for half a century. He did not mean that the result should be faster than 2½ miles per hour, but that the piston should not rise up and down in the cylinder faster than 2½ miles an hour, which was only 4 feet in a second, while the motion of steam of 15 lb. was 1,100 feet in a second. Fortunately, however, this old maxim had been abandoned, and the piston now moved from 250, 270, to 300 feet in a minute. For this improvement they were indebted to no new principle, but to the application of mathematical principles of science. He now came to another great improvement, which was the change in the formation of steam-boats, which had been radical—he meant the entire alteration in the form of the ships. A few years ago steam-vessels which would go ten or twelve miles an hour were deemed fast ships; now, however, we had attained a much higher rate of speed. Vessels were then built on the old fashioned principle that the water-line should be nearly straight, and that the run of the vessel should be a fine line, and that there should never be a hollow line, except a little in the run of the ship, but that there most certainly should not be any hollow line in the bow, for there the water-lines should be straight or a little convex. Researches and inquiries were, however, made by a Committee of the British Association as to the form which would enable the vessel to go fastest through the water. These inquiries lasted for years, and they established, by a series of experiments, a set of very curious facts. Formerly, every builder of ships had his notion of proportion; some that the length should be four times the breadth—others that it should be 4½ or 5,—and some went as far as to say that the length should be six times the breadth, but these were deemed innovations: so that although the proportions of width as compared with breadth were said to be fixed ones, yet strangely enough every one differed as to those proportions. Another question was what part of the vessel should have the greatest width, and it was generally thought that the greatest width should be nearest the bow. Some daring persons had, however, put it back as far as the centre of the ship. This was, however, the exception, and not the rule. Then there was another great principle which was that the bow and the stern should exactly balance each other,—that is, that the vessel should be equally balanced; but the new rules which the British Association had established were as follows:—They began by upsetting the old rule with respect to the proportions which the length should bear to the breadth, finding that the greater the speed required the greater should be the length, and that the vessel should be built merely of the breadth necessary to enable the engines to be put in, and to stow the requisite cargo. Then the second great improvement made by them was that the greatest width of water line, instead of being before the middle, should be abaft the middle of the vessel, and in fact two-fifths from the stern, and three-fifths from the bow. The next great improvement was that, instead of having the bow broad and bluff, or a cod's head bow, for the purpose of rising over the wave, you might have hollow water lines, or what were called wave lines from their particular form, and with that form the vessel would be propelled with less power and greater velocity,—and also that instead of keeping to the old fine run abaft and cutting it away you might with great advantage have a fuller line abaft, provided it was fine under the water. Thus by these improvements the form of the old vessel was pretty nearly reversed, to the great annoyance of the old school, and the steamers were given large and commodious cabins and after holds, instead of having cabins so pinched in that you could hardly stand in them. Another heresy, introduced by the British Association, was that of the principle as to the balance of the stern and the bow upon which they now rested; but which was founded in a most singular error, for they left out something which was very material. They concluded that the wave acted equally on both ends of the vessel in striking it; but they did not take into consideration the impossibility of this when a vessel was moving, not having taken into calculation the velocity of the wave or of the vessel, and that from this circumstance the concussion from a wave striking the bow would be a most powerful one, while it could not be so with regard to the stern, because if the velocity of the wave meeting it was fifteen miles, the shock would be as of thirty miles; and, therefore, it became most plain that the bow would give the greatest resistance to the wave. He had examined all the fastest steamers which had accomplished fifteen to seventeen miles an hour,—and in smooth water eighteen miles an hour; and he would venture to state that there was not one of them which accomplished from fifteen to seventeen miles an hour, which had not all these alterations in every particular, and that the wave form and wave principle were now adopted by all the great steamship builders, and that all the fast steam-boats had what was called the wave bow. Now, of the eight boats on the Holyhead and Dublin stations, if examined, it would be found that all of them were built on these principles, although in some of them there was still left a little of the old principle, some of the boats being made a little fuller and more straight; and if any one would look at one of these boats, it would be perceived that the moment they moved the very wave itself rebelled against them and broke against their bows,—and that consequently these were slower than any of the others. All of them, however, were vessels of the first class; and he gave the details of their construction,—for which we have not space. All of them were examples of the value of the form and the principles which the British Association had advocated and introduced at a very early period in its history.—Mr. J. Taylor stated, that as Treasurer of the Association, he could bear witness to the value of the efforts of the Association in this direction; and he felt bound in justice to state that the credit Mr. Russell had given to the Association was chiefly due to himself, as the individual who, with the late Sir J. Robinson, had conducted the investigations on this subject.

Mr. J. Price rose to say that he agreed with Mr. Russell in all that he had adduced. There was, however, one mode of steam navigation—one mode of propulsion to which he had not alluded, he meant the mode of propulsion by the screw propeller. He would, therefore, mention that they had built a little vessel called the Neath Abbey, which plied from Neath to Bristol, a distance of upwards of sixty miles, and which had only two 12-inch cylinders, in fact a mere toy—of course using high steam. Now, she could walk round the Beresford, which had two 40 horse-power engines:—the working her upon the high-pressure steam principle necessarily increased the speed of the piston. With these engines they had stepped out of the old track. They had not adopted the American plan of a high-pressure engine and puffing off the steam, but of a high pressure engine without puffing off the steam and without using a jet of cold water. He confessed that when this plan was proposed by his younger coadjutors he, as one of the old-fashioned, hesitated,—but at length he consented. The Neath Abbey had a screw propeller with three blades, which were immersed under the water—her propeller being about 3½ feet in diameter. The vessel is built in the best form, allowing sufficient breadth for her engines. The two 12-inch cylinders are placed diagonally and slung up by wrought iron beams, and they lay hold of one crank pin like the hands of two men working at a grindstone; and thus they conducted their engines almost in a snuff-box. Then they employed their boiler in the manner described by Mr. Russell. Then they came to the condensation of the steam; which they did not allow to go puffing off, but let it pass back into the boiler condensed and in a distilled state,—which accounted for their never having any mud or dirt in their boilers.

Mr. J. C. Dennis read a paper 'On Improvements in the Reflecting Circle—more particularly in reference to an Instrument for the Purpose of measuring regular Distances of the Sun and Moon.'—So great is the accuracy required in instruments of this kind that it is necessary to distinguish to the 5940th part of an inch. The smallest error of construction therefrom produces a serious error in the observation; and to render the construction more perfect, the following suggestion is made:—Instead of attaching the circle (technically called an arc) to the parts which support it, let the whole be cast in one piece, and then placed, polished, or divided to suit the purposes of modern astronomy.

To Correspondents.—R. A.—T. M.—R. C.—D. S.—L. A.—ינץ—C. H. C.—X. Y. Z.—received.

VICTORIA LIFE ASSURANCE COMPANY,
18, KING WILLIAM-STREET, CITY.

Residence in many of the Colonies allowed, *without additional charge*, and the premium required for the *East or West Indies*, and other extra risks, is more than usually moderate.

On Policies taken out for the whole term of life, *one-third* of the Annual Premiums may remain unpaid *till death*; thus parties are enabled to effect an assurance, say for 1,200*l.* by the payment of Premium on 800*l.* only.

The *half-credit system* for five years is also adopted.

Four-fifths, or *80 per cent.* of the entire profits are appropriated to assurers entitled to share therein.

The *Bonus* at the last division averaged *23 per cent.* on the amount of premiums paid.

Advances continue to be made to assurers on assignable property or income, and also on the guarantee of most undoubted personal securities.

WILLIAM RATRAY, Actuary and Secretary.

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CAPITAL, ONE MILLION.

This Institution is empowered by a Special Act of Parliament (5th Vict. cap. IX.), and is so constituted as to afford the benefits of Life Assurance in their fullest extent to Policy-holders, and to present greater facilities and accommodation than are usually offered to the Public.

The ample Subscribed Capital, together with the large and continually increasing Fund, accumulated from the Premiums on upwards of 7,000 Policies, affords complete Security to the Assured; whilst the magnitude of the Company's transactions has enabled the Directors to offer unusual advantages to Policy-holders, as will be seen by reference to the Prospectus, and to the varied and extensive Tables which have been computed with great care and labour, expressly for the use of this Institution.

PETER MORRISON, Resident Director.

ASYLUM DOMESTIC and FOREIGN LIFE OFFICE, No. 72, Cornhill, established 1824, for INVALID and HEALTHY LIVES, and Officers and others travelling or resident Abroad.

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Deputy-Chairman—Charles William Hallett, Esq.

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Ascending Scale, progressing at pleasure of party.
Alternative Scale, one-third of life premium on loan at 4 per cent. repayable, or out of sum assured.
Invalids insured at rates adapted to circumstances.
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Formalities waived, and Policies virtually completed in a day.
Prospectuses may be had, on written or personal application.

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FIRE. LIFE. ANNUITIES.
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THOMAS LEWIS, Secretary.

The system of returning Profits on Fire Insurances was adopted at the foundation of the Union Society in the year 1714.

*** Agents desired in places where none are at present appointed.

THE NORTH OF SCOTLAND ASSURANCE COMPANY.

NOTICE IS HEREBY GIVEN, that by an Act of Parliament obtained in the present Session, the above Company is constituted a Corporation under the name and designation of the

NORTHERN ASSURANCE COMPANY.

In the beginning of 1847, the *Western Assurance Company of Scotland* was merged in this Company, and the Directors have much pleasure in announcing the recent completion of an arrangement for the transfer of the business of the *Scottish Masonic and General Life Assurance Association*.

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A. P. FLETCHER,
Secretary to the London Board.

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The following are among the advantages offered by this Society :—
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LOWER RATES of Premium than those of any other office, which entitle the Assured to participate in the profits, and *considerably lower* than those of any other Mutual Assurance Society.
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BONUS.

NOTICE.—FOUR-FIFTHS of the net Profits realized by the Company from Insurances effected upon the *Participating Scale* of Premiums allotted, agreeably to the conditions of the Policies, every Seven Years, commencing from the 3rd of July, 1840.

The following is a specimen of the Bonuses declared at the first septennial investigation up to the 2nd of July, 1847.

Age when Assured.	Sum Assured.	Premiums Paid. Number.	Premiums Paid. Amount.	Bonus added.	Per centage on Premiums Paid.
15	£3 00	6	£315 0 0	£164 16 8	£52 6 6
25	5000	7	775 16 8	347 13 4	44 16 3
35	2500	6	431 17 6	183 18 0	42 11 8
45	2000	6	464 0 0	172 6 7	37 2 10

The following is a specimen of the Annual Premiums required for the Assurance of £100 on a single life :—

Age.	Without Profits.	With Profits.	Age.	Without Profits.	With Profits.
15	£1 11 0	£1 15 0	40	£2 18 10	£3 6 5
20	1 13 0	1 19 3	50	4 0 9	4 10 7
30	2 4 0	2 10 4	60	6 1 0	6 7 4

ROBERT TUCKER, Secretary.

NEW LIFE TABLES.
THE ALLIANCE LIFE and FIRE ASSURANCE COMPANY, Bartholomew-lane, London. Capital 5,000,000*l.* sterling. Established 1824.

SECURITY.—The large invested capital, and the personal responsibility of upwards of one thousand shareholders.

The Board, with a view of giving increased facilities to the public in the transaction of life business, have directed the construction of various tables in addition to those they had previously in use.

1. NON-PARTICIPATING on Reduced Rates of Premium.
2. Tables on INCREASING and DECREASING Scales.
3. " subject to a LIMITED Number of Annual Payments.
4. " for ENDOWMENT ASSURANCES.

No entrance fees are charged. The assured may proceed to any part of Europe without extra premium. The lives of Naval and Military Officers, not in actual service, are taken at the usual rates. A commission to solicitors and agents bringing business is paid.

Detailed Prospectuses, with tables of rates and full particulars, will, on application, be forwarded by post, or may be obtained at the Head Office, 1, Bartholomew-lane, London ; at the Office of the Company, 95, George-street, Edinburgh ; and at their various agencies in England, Scotland and Ireland.

*** Loans on the deposit of unencumbered Policies of the Company are made, up to their value, without legal expense to the borrower.

FIRE ASSURANCES, at home and abroad, effected on the usual terms.

A. HAMILTON, Secretary.

PROVIDENT LIFE OFFICE, 50, Regent-street, and 2, Royal Exchange Buildings, London. Established 1806.
INVESTED CAPITAL, £1,230,000.

Annual Income, £140,000. Bonuses Declared, £743,000.
Claims paid since the establishment of the Office, £1,678,000.

President.
The Right Honourable EARL GREY.

Directors.

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The Rev. James Sherman, *Deputy-Chairman.*

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William Judd, Esq.	William Henry Stone, Esq.
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John A. Beaumont, *Managing Director.*
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The Rates of Premium are those adopted by the principal Life Offices ; the rate without bonus is lower than that of most other offices.

The Bonuses are added to the Policies, or applied to the reduction of the Premiums.

Policies issued by this Office are purchased at their full value ; or Loans may be obtained upon them after they have been in existence for five years.

If a party neglect to pay for the renewal of his Policy, he may repair the omission any time within 12 months, upon proof of good health.

The profits (subject to a trifling deduction) are divided among the Insured. The plan upon which they are divided gives to each party insured a share proportionate to the amount of the Premiums he has contributed.

In addition to the above advantages, the Directors have determined to adopt the principle of allotting a prospective Bonus to Policies lapsed between the Septennial Periods of Division, in order that all the Policy-holders may participate equally in the Profits of the Society.

The following Table shows the amount of Bonus added to Policies existing at the present time.

Policy.	Date of Policy.	Sum insured.	Bonuses added. £. s. d.	Increase on original Insurance.	Total Sum payable, to which future Bonuses will be added. £. s. d.
No.		£			
21	1806	500	415 10 2	83·10 per cent.	915 10 2
521	1807	900	982 12 1	109·17 "	1882 12 1
1174	1810	1200	1160 5 6	96·68 "	2360 5 6
1395	1811	1600	1328 8 6	83·02 "	2928 8 6
2286	1820	2000	1906 13 5	95·33 "	3906 13 5
3392	1820	5000	3558 17 8	71·17 "	8558 17 8
4356	1822	3000	2541 3 6	84·7 "	5541 3 6

Prospectuses and full particulars may be obtained upon application to the Agents of the Office, in all the principal towns of the United Kingdom, and at the Head Office, No. 50, Regent-street.

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